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78th Cavalry Rcn. Troop members, mounted on some of Germany's finest horses, move up the Kurfurstendamm in Berlin recently as civilians watch. In the background is the shell of the Kurfurstendamm church.

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The Infantry-Tank Team

by Lieutenant Colonel W

In mutual support, members of the tank-infantry team are shown advancing as troops crouch low behind tank.

(This article was written in March, 1944, while the author was serving with the XIV Corps on Bougainville, Solomon Islands. It describes the methods of infantry-tank employment in jungle warfare which were developed in the XIV Corps by combined infantry-tank training and combat experience. Some of the tactics and expedients which are given are unorthodox, but the limitations imposed on tanks by jungle terrain required answers that were not in any book at that time. This article was not published in 1944 because of security restrictions. Recently these restrictions were removed and the article is now published because it clearly describes practical and realistic solutions to the problems of tank employment in jungle warfare. The success of the infantry-tank teams of the 37th and Americal Infantry Divisions and of the 754th Tank Battalion in their stubborn and prolonged defense of the Torokina Beachhead on Bougainville is ample proof of the soundness and value of the methods described in this article.—Editor's Note.)

Photos by Signal Corps

BY decisively defeating the Japanese in many local actions, infantry-tank teams proved their ability to operate in the jungle terrain of the Pacific Islands.

The following observations governing their employment are a result of training and combat experience based on careful consideration of the capabilities of tanks and the limitations imposed upon them by jungle terrain.

1. Tanks must be employed only over terrain suitable for tank movement and against definitely located enemy resistance.
2. Infantry-tank attacks in jungle terrain are normally for limited objectives only; therefore, the plans must include measures for rapid reorganization of all objectives.
3. The fire power of the tank assumes great importance in the jungle because of the limitations on maneuver and shock action. Therefore, whenever possible formations must have a maximum number of tanks in line to exploit their fire power.
4. To facilitate control, tank formations must be very simple. Wherever possible tanks must be carefully placed in attack formation behind the line of departure.
5. The infantry-tank attack requires maximum fire support by infantry and artillery weapons, both before and during the attack.
6. Advances must be by short bounds with frequent short halts for reorientation and reorganization.
7. Tanks must be employed in mass, not piecemeal, and in sufficient strength to insure continuity of effort.
8. Tanks and infantry must develop perfect teamwork: the tanks must provide accurate, direct fire against resistance holding up the infantry advance; the infantry must provide close-in security for tanks during their approach, attack, and withdrawal.
9. Constant communication between infantry and tank commanders must be maintained.
10. Maximum use must be made of bulldozers and engineer equipment to assist movement of tanks in jungle terrain.

Formations

The basic unit of the infantry-tank team is comprised of one platoon of tanks and one platoon of infantry to which are attached certain engineer specialists. The team operates in three echelons. First, an assault wave of three tanks; second, a support wave of two tanks, each of which is followed closely by an infantry squad with attached engineers; and third, the platoon reserve which contains one reserve tank and the remaining foot troops.

am in Jungle Operations

Wilbur C. Strand

Somewhere in the Pacific: Dead Japs attest the success of the infantry-tank team in combat in the jungles.

Around this basic unit, suitable company and battalion formations can be built up by employing infantry-tank teams in line, in column, or in echelon. In order to exploit the full fire power of the tanks, to maintain direction, and to prevent tanks from endangering each other by their own fire, whenever possible the team's advance should be made in line. Since combined operations of infantry and tanks in the jungle are inherently complicated, every effort must be made to keep formations as simple as possible.

Because of the extremely poor visibility in dense jungle undergrowth all distances and intervals must be greatly reduced, at times to as little as 5 or 10 yards.

Communications

Constant and adequate communications are necessary within the tank and infantry units as well as between them. Many methods have been used to provide it, but best results have been obtained with the following:

Infantry company commander to infantry platoon leaders—by sound-powered telephone or runner.

Infantry company commander to tank officers—SCR 510, to SCR 508 in tanks.

Infantry platoon leader to infantry squad leader—SCR 536. A radio operator carries the radio and passes orders to the squad leader, who is thus free to direct operations of the tank and infantry under his immediate control. Runners are used if radio communication fails.

Infantry squad leader to tank commander—An EE8A telephone is placed inside the tank turret and a regulation flashlight is strapped in a position conspicuous to the tank commander. A 20-foot length of 4-strand electric cable is extended from the phone box inside the turret to the rear of the tank. At the end of the cable is attached an EE8A telephone handset. The butterfly switch on the handset is modified so that when pressed it will complete a circuit through one channel of the cable, and light the flashlight and attract the attention of the tank commander. Telephone conversation is then held over another channel of the cable. The use of the flashlight makes it possible for the infantry to signal the tank commander in spite of the noise of battle and the noise in the tank. The assistant squad leader carries the telephone handset and passes information from the infantry squad leader who directs the fire and movement of the tank.

Infantry platoon leader to tank platoon leader—The most satisfactory means of contact is an EE8A telephone combination. Another method is by SCR 536 to the reserve squad, thence by radio from the reserve tank to the tank platoon leader.

Engineer officers—The engineer officer is equipped with a SCR 593 (receiver) to keep abreast of the situation. He communicates with the Company CP by runner.

Target Designation

Tanks are almost blind in thick jungle and for that reason infantry squad leaders must designate to tank commanders obstacles to avoid and targets to fire on. Since enemy pillboxes and positions are extremely well camouflaged, target designation is difficult. Tracer fire for the designation of targets to tanks in the jungle is unsatisfactory. The use of colored smoke grenades proved most successful. It was found that fully charged grenades produce too much smoke and obscure the target. However, if the grenade fuze is unscrewed and half the charge removed an adequate amount of smoke is produced. To obtain a longer range, projection of the grenade from a rifle is desirable. The best results are obtained by arming the rifle grenade before firing since this produces a trail of smoke to the target.

Advance Preparations

An early and thorough reconnaissance by infantry, tank, artillery, engineer, and communications officers is essential. Detailed reconnaissance is necessary in order that all commanders concerned may formulate a mutual plan of action.

A tank-infantry team protects organization of a newly won position; second man, left, talks to tank by phone.

Routes of approach—If suitable routes of approach for tanks do not exist, they must be prepared by the engineers.

Natural obstacles—The jungle contains many natural tank obstacles such as swamps, dense forest and undergrowth, precipitous slopes, coral or volcanic ridges, and numerous streams. Engineer troops must assist tanks by clearing trails and improvising bridges or crossings in swampy terrain. Medium tanks can operate through very thick undergrowth which contains small trees and matted vines, but they must detour around large trees, stumps, and fallen logs which are more than two feet high.

Minefields—It must be anticipated that the enemy will employ minefields and antitank guns to cover likely avenues of approach. Preliminary reconnaissance must be thorough to avoid the use of tanks over mined areas. If an attack is to be made over such an area, the mines must first be removed, either after the use of mine detection apparatus under cover of darkness or smoke and heavy protective fires, or by mortar or artillery fire, bangalore torpedoes, or prima cord.

Tank Park—It will be necessary to establish a tank park near the main supply routes. It should be protected from hostile artillery or mortar fire, if possible, and secure from enemy raiding parties. Dumps of fuel and ammunition should be established and facilities provided for the repair and maintenance of tanks and ordnance.

Reservicing Point—This point must be located conveniently near the zone of action. Normally two units of fire and one refill of fuel should be maintained at the reservicing point. Emergency maintenance crews also should be present.

Attack Position—This is an area close behind the front line where the tanks carefully deploy in their attack formation, and where the infantry and engineers take position in the formation, and final instructions are given. Here timely coördination with front line units must be effected and information on additional targets obtained. Normally not over 20 minutes should be spent in the attack position because excessive delay may warn the enemy of the impending action. Selected routes from the attack position to the line of departure must be reconnoitered in advance and marked with guides or tape.

Rally Point—The rally point may be the attack position, the reservicing point, or some other designated area. Plans must be made for emergency maintenance crews to meet the tanks at this position where, after an attack, the tanks are reorganized and reserviced. Casualties should be evacuated from this point and disabled tanks towed back to it.

Reserve Tanks—One tank company should not make more than two sorties during a day's action in the jungle. If action is to be longer, a reserve tank unit should relieve the original unit.

Supporting Fires—Prior to the attack, heavy concentrations of artillery fire are essential, but should be withheld until after reconnaissance has been completed. This will permit reconnaissance parties to operate with greater concealment, since artillery fire destroys jungle growth. After all reconnaissance has been completed and before the tanks leave the tank park, a heavy artillery concentration should be placed on the enemy positions. Shells must not be fuzed for tree bursts, because heavy limbs will be torn down and hinder the advance of the tanks. Bursts which demolish undergrowth are especially desirable, for enemy pillboxes are more easily spotted when shorn of screening vegetation. As the tanks approach the front lines, artillery fire should shift to the enemy rear but remain at maximum intensity so that the noise covers the sound of the approaching tanks. In general, infantry support weapons conduct fires by normal methods.

Conduct of the Attack

Advance—The infantry-tank team line moves forward at a slow rate. It is the duty of the tank company commander to keep the advancing tanks in line; and all commanders must be particularly careful to prevent tanks from firing on each other or on friendly troops. During counterattacks an infantry officer or NCO from the immediate front lines should ride in each assault tank and indicate to the tank commander the positions held by our troops and any known enemy.

The infantry-tank team in action—The team goes forward in three mutually supporting echelons or waves. The mission of the assault tanks, which advance slowly, firing cannon and machine guns at close range, is to gain fire superiority over the enemy, to force him into cover, and to clear out jungle growth so that enemy pillboxes may be seen. If a target is located, the tanks de-

stroy it with cannon and machine gun fire.

In thick jungle, the two support tanks of the team advance along the tracks made by the two flank tanks of the assault wave. The mission of the support tanks is to knock out pillboxes and entrenched enemy which have been by-passed by the assault tanks, to cover the assault tanks, and by canister and machine gun fire prevent the enemy from approaching the tanks to disable them with mines or incendiaries. Support tanks designate targets to the assault tanks by radio-transmitted messages coördinated with smoke grenades thrown by the infantry. They also destroy snipers in trees with canister fired into tree tops, or with AP and HE fired into tree crotches.

The mission of the infantry squad in rear of each support tank is to locate enemy pillboxes and intrenchments and to designate these targets to the tanks by throwing or projecting colored smoke grenades onto them and by giving the appropriate directions to the tank commander. The squad also destroys by fire any enemy seen above ground, especially those who attempt to swarm over the tanks and damage them. In addition, it searches all holes and pillboxes which have been passed over and destroys the enemy therein with flame throwers, grenades, or explosive charges. Particular attention must be paid to enemy who feign death.

The mission of the team reserve is to repel enemy counterattacks; it also provides a reserve for replacing damaged tanks. Reserve tanks may be employed to knock out by-passed pillboxes or to fire on snipers. The enemy on the flanks may withhold fire until the assault tanks have passed and then deliver flanking fire on the infantry and the tanks. Infantry squad leaders, therefore, must make every effort to locate enemy positions and to direct the fire of the tanks toward them. To facilitate this, tanks and infantry should cease firing for short periods.

The infantry platoon leader must decide when to cease fire, and give the necessary orders. He must be well forward and in a position between his two advance squads to enable him to keep fully abreast of the situation at all times, and maintain adequate control. He must be accompanied by two or three riflemen who precede him for close-in protection, and a radio man to operate the SCR 536.

Organization of Captured Ground

When the objective is reached, the tanks halt and fire with all available weapons at definite targets or places of likely enemy approach or concealment. The infantry squads of the assault teams and the company support team should immediately push forward to the rear and flanks of the tank line and construct a hasty defensive position.

If the attack formation employs a company of tanks with a company of infantry (i.e., three infantry-tank teams in line or in echelon), a reserve reinforced company of infantry should follow up and construct the defensive position. The standard procedure of emplacing automatic weapons and mortars, or organizing the ground, digging in, and putting out protective wires should be used. Prepared concertinas for use in the defense may be carried into action on the rear decks of support tanks.

No guns should be emplaced or wire laid in the lanes made by the tanks as they advance in the attack. After the defensive position has been organized, the tanks and their protecting squads should withdraw over the original routes of advance. In turning about to withdraw, all tanks, if possible, should turn to the right about. Such a standardized procedure will enable the protecting squads to clear the danger space without confusion and subsequent loss of time. Before withdrawing, tanks must reverse their turrets and keep their guns trained in the direction of the enemy because enemy antitank guns silenced in the action may be remanned in time to fire on them as they withdraw. After the tanks have retired, the lanes are closed with concertina wire.

Special attention must be given to strengthening the flanks of the salient. To insure that no enemy are feigning death, the infantry must minutely investigate all ground within the salient and search all positions for personnel.

Use of Screening Smoke

Visibility in the jungle is so limited and observation so essential in the infantry-tank attack that the use of

Infantrymen mop up a position with rifles and grenades.

A light tank and supporting troops advance under fire.

screening smoke is not normal. If a minefield exists in the line of advance, however, smoke screens may be used to conceal the ground troops who remove the mines. Smoke should be used early enough to allow it to dissipate by the time the attack is launched. At the end of the attack, a smoke screen may be utilized to cover the withdrawal of the tanks and to mask from the enemy the digging in and wiring operations of the infantry as a defensive position is constructed.

Special Missions

Often tanks are employed individually or in small groups of two or three to reduce an isolated strong point which cannot be overcome by artillery or mortar fire, nor taken by infantry assault without undue cost. In such instances the enemy position must be located and a feasible route of approach to it reconnoitered. The tanks should move over the selected route to the position under close guard by a detail of infantry. The attack may be launched with a combination of infantry-tank tactics, or the position may be reduced by short-range direct fire by the tanks. Fire by canister and machine guns will frequently tear away undergrowth or camouflage and permit the gun ports of pillboxes to be seen. HE shells can then be fired into the openings. Tank-mounted flame-thrower fire may also be used effectively. Where no openings appear, AP shot will frequently make a breach in the pillbox through which HE can be fired.

At times enemy snipers armed with rifles or LMGs climb trees overlooking our lines and deliver plunging fire into our positions. Where they are too close to be dislodged by tree bursts of mortar shells, tanks are effective in dispersing or destroying them. Usually they are never definitely located. Canister and machine gun fire delivered into suspicious looking tree tops and AP shot fired through the boles of trees at suspected sniper perches will usually silence such enemy fire.

Single tanks are sometimes employed as mobile pillboxes to secure avenues of approach into our positions or to protect newly won vital installations until proper defenses can be organized. Tanks must always be protected by infantry when used for such purposes.

Small groups of tanks and infantry may be employed to make a feint on an enemy position in order to divert attention from another operation, such as the recovery of wounded.

Training the Infantry-Tank Team

The success of the infantry-tank team depends on intensive, thorough, combined training, sound planning, and aggressive execution. Reconnaissance of training areas must be made by both tank and infantry officers prior to any field work. Areas selected must conform to the particular phase of training being emphasized. The training program should begin with conferences on technique, formations, and mutual coördination. Large sand-table models representing actual terrain to be operated over are excellent for demonstrating team formations. Extended order drill in open terrain is an important preliminary step in familiarizing both infantry and tank personnel with formations to be used. Tactical problems that will be met in the jungle should follow, beginning with the smallest infantry-tank unit and progressing to company and battalion attack problems. Extensive use should be made of blank and live ammunition, dummy pillboxes, explosive charges, smoke, and other expedients which will render the training realistic. Special observers should watch attacks from enemy positions in order to spot weaknesses in technique.

A flame thrower is used to mop up a by-passed position.

Signal Corps Photo

Experienced troops on patrol in Luzon are shown taking full advantage of the terrain for concealment.

PATROLS IN THE JUNGLE

PART I

(The following article has been condensed from a Training Memorandum prepared by Headquarters I Corps. Although it is to be noted that some modifications are recommended for scouting and patrolling in the jungle, the basic principles outlined are almost identical with the instructions given in War Department training manuals, which have been SOP for years.—EDITOR'S NOTE.)

UNDER the conditions that exist in jungle warfare, in which visibility usually is restricted and terrain tends to canalize activities, orthodox patrol formations often must be modified or abandoned entirely for new ones. Nevertheless, when all of a theater of operations is not jungle, the use of normal patrol formations should be utilized when conditions permit.

BASIC CONSIDERATIONS

Patrols are employed for a number of missions, the most important of which are: to gather information (reconnaissance); to protect other troops (security); and to harass or raid the enemy (combat).

Other basic considerations which govern the operation of a jungle patrol are its size, the assembly points and objectives, maintenance of direction, chain of command, rate of march, and equipment.

To these should be added the general realization by the commander who sends it out that the patrol's mission must be simple and definite. A single patrol cannot execute involved missions efficiently. It is better to use a number of patrols, each with a single mission.

Size of Patrol—Generally depends upon: (1) The mission it is to perform. (2) The distance it will operate from friendly troops. (3) The length of time it will be out. (4) The number of messages it may be required to send back.

Combat missions ordinarily require stronger patrols than reconnaissance missions, although the latter may

have to fight at times in order to obtain information. Patrols that operate at considerable distances from friendly troops must be stronger than those used for close-in work, because of greater danger from attacks and need for more equipment such as radios. The longer a patrol is away from its unit, the greater its requirements will be for messengers and equipment.

Patrols larger than a squad are harder to control and to conceal, tend to be more noisy, and usually make slower progress, but can send back messengers more frequently without loss of effectiveness.

When the area is reached where detailed reconnaissance is required, effective use of patrol personnel can be made by establishing a central base of operations and sending out a number of two or three man patrols from there. When time is short and a large area is to be investigated, this method is especially useful and the size of the patrol will be determined on this basis.

In general, use the least number of men to accomplish the mission, with due regard to safety, available time, and message requirements. For jungle operations no patrol should consist of less than three men. This number may be regarded as a basic *jungle scout team.*

Assembly Points, Objectives—Patrols should have a designated assembly point at which every member can reassemble in case of dispersal through ambush or surprise attack. Members of a dispersed patrol should endeavor to reach this point with all possible speed in order to facilitate resumption of the mission.

The patrol should progress from one designated objective to another. When the first has been reached, the patrol is halted and a new objective and assembly point named. New assembly points should be selected which afford concealment in the vicinity of the objective just reached. This will enable the patrol leader to point out the exact spot on the ground before the patrol proceeds to the next objective.

Maintenance of Direction—A patrol maintains direction when possible by marching on prominent terrain features. If there are none, compasses must be used. Each patrol must carry at least two, one for the leader, and one for the second-in-command in the rear, who guards against any deviation from the proper course. A qualified member of the patrol should serve as map man. He will know the patrol's location at all times and assist the leader to maintain the proper direction.

Rate of March—The leader must calculate in advance how fast he must move in order to accomplish the mission in the time allotted. The rate of movement will vary, depending on differences in terrain, proximity of the enemy, time of day, and the amount of detailed observation which is required. Patrol members should know each objective and the time required to reach it.

The rate of movement ordinarily necessary to complete the mission on time will not permit slow advances by creeping and crawling, or by successive short rushes by individuals. On terrain where good cover is available, however, but which is known to be under enemy observation, to avoid giving away the location of the patrol or sustaining losses, open spaces of 300 yards or less may be crossed by creeping and crawling. The same method of approach may be made when close to enemy positions, or to exposed observation points near the final objective. Except in combat, patrols do not advance by short rushes; time does not permit it. In crossing open ground the longer the patrol is exposed the more danger it is in. In general, reliance should be placed on the security groups while the patrol advances at the normal rate. When a patrol reaches the edge of an open space that cannot be avoided it should preferably be halted under cover while the point rapidly investigates the cover on the opposite side. Upon signal from the point that the cover ahead is not occupied, the patrol resumes its advance at the normal rate.

Equipment—A patrol should travel light to reduce fatigue but sufficient equipment must be carried to insure effective action. In the jungle, machetes are needed to cut trails, entrenching shovels are useful if combat develops. Compasses are invaluable for maintaining direction, and a pair of field glasses and a watch should be made available to the patrol under any terrain conditions. Rations are carried only on long missions and then in minimum amounts. Ammunition needs are anticipated and issue made accordingly. Personal equipment taken by patrol members must be checked to avoid carrying excess weight. Individuals must carry tablets for chlorination of drinking water if the patrol is to be out for more than 12 hours. A radio should be taken if the mission indicates its necessity.

Characteristics of Patrol Formations

Patrol formations are not hard and fast arrangements of personnel in the same manner as are squads in close-order drill. They are fluid and flexible, and permit the individual patrol members to take full advantage of cover and terrain. The formation in use by the patrol at any one moment should be naturally adapted to that particular piece of terrain. It should be developed by the patrol members on order from the leader, and based almost entirely upon their ability to see each other and at the same time make full use of cover and concealment. After deciding what formation will be used, the patrol leader conveys his decision to the patrol by signal, and members of the patrol change their relative positions to conform.

Within the designated formation, points and flank groups will move in and out as required in order to observe any cover up to 100 yards that might harbor an enemy. Their movement, however, must not be made in such a manner that it will prevent the inside man from maintaining visual contact with the patrol leader. In general, the lateral movement of flank groups will be limited to 100 yards from the line of advance.

The selection of suitable formations for different kinds of terrain, time and weather depends entirely upon the factor of visibility. When visibility is poor,

contact between patrol members can be obtained in normal terrain by the use of the skirmish line, wedge or column formations. When it is good, contact between members is facilitated, and in normal terrain, the diamond, or line of half squad column formations are suitable. In jungle terrain at any time and in any weather, column formations are required.

Two things determine the leader's position:

1. If a clearly defined route can be prescribed in advance so that the leading scout can follow it, the patrol leader may be located anywhere within the patrol where his signals can be readily seen by individual members.

2. If the route cannot be definitely prescribed, the patrol leader must be in the leading group.

On well-defined trails loss of leaders will be reduced if they are located back of the point. When the route is not clearly defined, speed of movement will be slow unless the leader leads his patrol.

All members of a patrol should be regarded as potential "get-away men" and should understand that they are to return to headquarters only when ordered to do so by the leader, or when the patrol has been dispersed and no one else reaches the assembly point.

Security

During movement as well as during the halt, provision must be taken for all-around security. Most formations provide for this, if members conduct themselves properly. While in motion, flank groups move in or out and investigate possible enemy positions adjacent to the route. On jungle trails, these flank groups may be unable to leave the track, but are nevertheless responsible for observation of their assigned flank. In normal terrain, any cover for an enemy up to 100 yards on the flanks must be observed by a movement of the flank groups to it.

A two-man flank group operates as follows: The man nearest the center of the patrol, while remaining within a maximum distance of 100 yards away, determines his position on the basis of visibility, since he must keep the patrol leader in sight at all times. The man farther out remains in sight of the inside man, but normally does not go more than 20 yards away.

While investigating a woods, the inside man moves along its outskirts while the outside man penetrates into it as far as possible without losing sight of the inside man. The two, however, should not be separated in most cases by more than 20 yards. When traversing a ridge the inside man stays on the side toward the patrol while the other man investigates the other side. In so doing, he maintains contact with the inside man, but avoids the skyline.

The rate of movement of the leading group must be slowed down at times to permit the flank groups to cover the greater distance they have to travel. In order that the entire patrol will not be endangered, the leading man of a point group rapidly moves forward as the patrol approaches a ridge line or thick cover that might harbor enemy troops, and he slows down and permits the remainder of the point to catch up on the down slopes where the cover is thin. Approaches to crests and dangerous areas are made as carefully as possible to avoid enemy detection. The rear group moves rapidly from point to point where observation is good while maintaining a maximum distance of about 100 yards from the center of the patrol. During their movements, front and rear scouts must not lose sight of the inside man of their group, who is in visual contact with the patrol leader. At least one man of all groups maintains a position from which the leader can be seen and his signals recognized. Individual members of a patrol adapt themselves to the requirements of terrain and visibility within these general limitations.

Should an important terrain feature be situated too far from the selected route of the patrol to permit investigation by a flank group, the leader should change the course of the entire patrol to cover it, particularly if it is of tactical value to the battalion or regiment. The entire patrol may traverse the feature or only the flank group, depending upon its size and importance. Such deviations from the selected route of a patrol are necessary maneuvers, and the patrol's actual route while maintaining its general direction will weave back and forth across its direct line of march, in accordance with the needs for flank observation and protection.

March Outposts

Automatically, and without exception, when it halts in enemy territory a patrol must establish a march outpost. The arrangement should provide for all-around protection. The mechanism of establishment follows:

1. The point, flank groups and rear point first halt in place.

2. Each group moves forward, to the flank or to the rear, far enough to permit them to see over or around or into cover which might harbor enemy groups. In no case, however, should the distance exceed 100 yards from the center of the patrol and, in the jungle, it will not normally be more than 50 yards.

3. While one man remains where he can see the patrol leader, the other man or men in the point or flank group move not more than 25 yards farther out. Members of the patrol remain in observation during the halt and take their former positions when movement is resumed. During short pauses of a minute or less when the patrol has halted for observation the patrol members remain in place, but when a longer halt is indicated the march outpost should be set up at once without command. It should be remembered that in normal terrain, if the flank groups are doing their work properly, they should be already in approximately correct position for the march outpost. If in the jungle, they move to the flank to the usual limits based on visibility.

(Formations adapted to jungle terrain and to normal terrain will be described in an article to appear in the next issue of The Cavalry Journal.)

Cavalry Reconnaissance

In the Solomon Islands

by Lieutenant Colonel E. C. D. Scherrer

During the New Georgia campaign the author, a Cavalry officer, Lt. Col. (then Captain) E. C. D. Scherrer, now an Instructor, Department of Tactics, The Cavalry School, was selected to direct and coördinate provisional reconnaissance patrols and the South Pacific Scouts. Lt. Col. Scherrer was awarded the Distinguished Service Cross and the Purple Heart with two Oak Leaf Clusters for his performance of duty in New Georgia.

AT dawn on June 30, 1943, in the South Pacific Theater of Operations, the third phase of the American offensive against the Japanese Imperial Forces began. The first and second phases had already been completed.

The first test of Japan's armed might began on August 7, 1942, when elements of the 1st Marine Division under command of Major General Vandegrift landed at Lunga Point on Guadalcanal Island on near-by Tulagi. From then until the end of the campaign on February 15, 1943, Guadalcanal was a vast rat hole down which were poured the lives of an estimated 42,500 Japanese soldiers, in a futile effort to prevent the American forces from gaining a foothold in the Solomon Islands.

The occupation of the Russell Islands, lying about 40 miles to the north and west of Guadalcanal, was carried out unopposed by the 43d Infantry Division in the early days of March, 1943. The second phase of the offensive was under way. Objective: complete local mastery of the air.

Because of their strategic position between Guadalcanal and Japan's air bases to the north, the Russell Islands figured prominently in this plan. At those bases were bred and born frequent bombing missions intended to prevent consolidation of our Guadalcanal positions. Russells-based fighters frequently were able to break up enemy bomber formations headed for vital shipping in the thriving roadstead off Guadalcanal.

Japan's last mighty air blow at this target was delivered June 7, 1943. Of a force of 120 Nip dive and torpedo bombers and fighters, 94 were shot down. The action cost us six aircraft, from which two pilots were rescued. Damage to our shipping was slight. Never again did the Japs risk sending aircraft in numbers south of the Russells. They resorted to ineffective hit-and-run raids which did nothing but arouse the ire of the doughboys who had to stay awake and alert during all *condition red* periods. The Jap was to pay off for that loss of sleep in days to come.

The second phase was finished. Our mastery of the local air was complete.

The third phase was an offensive aimed at the heart of Japan's outer ring of island defenses at Rabaul, New Britain. The first step was of necessity the neutralization, occupation, and conversion to our own use of the enemy air bases at Munda, New Georgia, and Vila, Kolumbangara. With these bases in our hands, air cover could be provided for the acquisition of islands and the construction of additional bases even farther to the north. New Britain itself had to be hit.

Preliminary reconnaissance of New Georgia and surrounding small islands was carried out over a period of weeks extending from the end of the Guadalcanal cam-

paign to the beginning of operations on Rendova Island, six miles from Munda, in the early dawn of June 30.

Available for the initial assault on Rendova Island, from which artillery support could be given operations on New Georgia, was a task force designated as "The New Georgia Occupation Force." It consisted of the 43d Infantry Division, the 37th Infantry Division, attached Marine units, and special units of both Army and Navy including naval construction battalions for the construction of airports. The 43d was located on the Russells and the 37th was on Guadalcanal where it had relieved the Americal Division on May 1.

The original plan of action directed that the 43d Division take Rendova Island (lying south of New Georgia) and adjacent small islands, to use as supply bases and staging areas to New Georgia proper. Simultaneous landings were to be made at Segi Island off the southern tip of New Georgia where an airfield was to be immediately constructed to render local fighter support. Jap positions at Rice Anchorage and Enogai Inlet on the northern shore of New Georgia were to be taken by the Marines plus attached infantry units from the 37th Division. These troops were then to establish a trail block south of Bairoko Harbor, also on the north shore, and east of Rice and Enogai. The trail block was to prevent supply and reinforcement of Jap forces around Munda on the south shore, since Bairoko was their port of entry into New Georgia.

After taking Rendova, the 43d was to effect landings on New Georgia, destroy the enemy garrison, and capture the airfield. The 37th, except for units already attached to the Marines, was to be held in reserve and committed on call from Force.

In working out the reconnaissance plans it was found that there was no agency available within the division whose background and training qualified it for the particular type of jungle reconnaissance required. At that time the 43d Cavalry Reconnaissance Troop had not had the proper degree of training in jungle lore and woodcraft which is vital to the successful performance of reconnaissance missions in jungle areas.

It was decided to form eight reconnaissance patrols, each to consist of one officer, one NCO, and three men; to be carefully chosen from among the best men in the division.

The writer was made responsible for coördinating and controlling the eight reconnaissance patrols.

As D Day drew nearer, it was learned that a company of South Pacific Scouts would be attached to Force for duty on D Day plus three. The Scouts were native Fijians and Tongans commanded by New Zealand officers and NCO's. I had worked with them in the jungles of Fiji, spoke the Fijian language, and knew them to be unsurpassed as bush fighters and scouts. Having lived in the jungle for generations, their instinctive knowledge of jungle lore is far greater than the average white man can hope to attain, even with the most careful training.

The D Day plan directed that two companies of Barracudas land and secure a beachhead on Rendova Island at 0430. The Barracudas were an infantry battalion specially trained for such assignments. A combat team made up of infantry and attached artillery was to land at dawn on the Barracudas' beachhead and secure the island. The major task of the reconnaissance patrols was to begin that evening. Reinforced by two companies of infantry, they were to make the first landing on New Georgia. They were to secure a beachhead and carry out reconnaissance of trails and beach areas suitable for use by the main body.

On the morning of D Day, daylight came gradually with low, overhanging clouds and a misty rain. The tops of mountains on Rendova and neighboring islands poked their heads into gray, impenetrable fog, and ships a few hundred yards distant were only dark blobs on the water, until the muzzle-flashes of their preliminary bombardment threw them into sudden, sharp relief.

At 0630, the barges were swung over the side, and upon completion of their rendezvous circling and, on signal, headed for the beach. The men silently watched the shore line ahead. We were quickly soaked to the skin with spray and rain, but no one seemed to notice. One man nervously slipped the safety of his M1 on and off, his eyes never leaving the swiftly approaching shore. It was now 0635. No opposition was anticipated in landing because the two Barracuda companies had been put ashore as scheduled at 0430 and should have secured the beachhead.

As we drew closer inshore, we could make out the long, even rows of a cocoanut plantation with low undergrowth and bush scattered among the trees. Suddenly, the sound of firing was heard, curiously deadened by distance and water, but considering the splashes around the boats, it was obvious that we were the targets. The machine guns on the boats opened fire, hesitant at first, because of their fear that friendly troops might be

somewhere on the beach ahead. The fire from shore increased. Where were the Barracudas? We had no idea, but it was apparent that the beach was still in the hands of the enemy. Our gunfire rose to a crescendo as the gunners got on the targets and poured lead into the low bushes and treetops. By the time we disembarked, the Japs had been driven off the beach. Patrols immediately fanned out to make contact. A short distance inland, the Japs waited. After about an hour of savage fighting, enemy resistance on the beachhead ended. The mystery of the Barracudas' failure to secure it was still unexplained. They were nowhere to be seen.

I went about my task of searching Jap dead, and made an interesting discovery which was to serve me well. I had heard that the Japanese possessed a distinctive odor, but had not placed too much stock in it until now. As I examined the still-warm bodies, sometimes within a minute of the time they died, I was convinced. Whether it was their clothing, their bodies, or the blood, I do not know, but there *was* a distinct, strong odor somewhat like that of a wild deer. Afterward, under favorable conditions, I was able to smell a Jap as far away as 50 yards.

The reconnaissance men secured little rest that day, due partly to anticipation of the coming night's work and partly to Nip dive bombers, which found the beachhead and inflicted considerable damage and casualties.

About 1100, the two companies of Barracudas, disgusted and weary, put in their appearance. In the darkness, they had been landed about three miles down the coast at another beach which they had taken and secured without seeing a Jap. With daylight, they perceived the mistake and proceeded up the coast to the cocoanut plantation where they were originally scheduled to land. The reconnaissance teams were to discover how easy it was to make such an error.

As darkness fell, the 46 men prepared to embark in Higgins boats along with one company of infantry. They were to pick up the other company on the way at another island, Baralulu, where they had landed that morning. The course to New Georgia lay through Oniavisa Passage to Baralulu Island and thence through Roviana Lagoon, which was studded with many small islands and submerged coral reefs. The waters were little known and the only available chart, which had been compiled from native information, was questionable at best. Their destination, Zanana Beach, was about 10 miles from Rendova, and the last two miles were unknown.

The trip from Rendova to Oniavisa Passage was uneventful. Speed was kept down in an effort to avoid damage by the deadly rocks, but several times the men caught their breath as coral scraped along the bottom of their boat. The craft slowed to minimum speed as it approached Baralulu. There was no sign of an infantry company. Nothing could be seen except the dark, forbidding tangle of jungle as the boats grated on the coral beach. Not a man made a sound. They listened for some sound of a friendly presence, but could hear nothing. The bow-door was let down. The first men leaped out on the beach and were followed by their comrades. Without warning, a blast of gunfire came from the jungle. The machine guns mounted on the boats replied immediately and raked the bush to provide cover for the men scrambling back into the boats. The motors roared as the boats pulled back off the beach and out of range. One man was dead and several wounded.

Since a landing at this point obviously was out of the question, it was decided to try at another spot farther down the shore. During the night, repeated attempts were made to get ashore on Baralulu and find the infantry company. Each was met by enemy fire or absolute quiet. Neither the infantry nor the native guide made an appearance. An order had been published to the effect that all water movements must be made under cover of darkness, so just before dawn, the landing party had to give it up and turn back. At daybreak, they landed at Rendova and turned the dead and wounded over to an aid station.

During the day, members of reconnaissance patrols "licked their wounds," reorganized, and planned to renew the attempt to land at Zanana that night. About 1000, word was received from the infantry company at Baralulu that the Japs had been driven off the beach and landings could be made without difficulty

That night, according to plan, the reconnaissance men embarked with the infantry to which another company had been added to form a battalion. The course was set for Zanana Beach, and the flotilla shoved off with all hands in high spirits. With inadequate charts and a native guide who was as lost as anyone else, it was impossible to maintain orientation with any degree of surety. There were dozens of small islands, each having the same appearance in the darkness, and hundreds of submerged coral reefs on which the boats were constantly becoming fouled.

Once, as they proceeded cautiously through the gloom, an illuminating flare suddenly popped overhead, throwing the boats and surrounding water into a ghastly white circle of radiance. Two planes circled overhead while everyone gritted their teeth and waited for the strafing or bombs they were sure were coming. The coxswains saved the day. They stopped their boats dead still to avoid showing propeller wakes. They were successful. The light presently died out, and the sound of the planes' engines faded away.

A short time later a white coral beach became visible ahead, curving away gently to the left. Everything was eerily silent except for the easy purr of the engines as they turned the propellers just fast enough to maintain steerage-way. That beach looked familiar to me. I knew I had seen it before somewhere, either physically, or on a map or aerial photo. I knew we could not land there.

As if in sudden agreement, the coxswain gave the throttle a shove. There was something unhealthy and forbidding about that dead white beach.

Dawn was approaching, and the mission was still fruitless. The flotilla commander announced his intention of starting back to Rendova in order to arrive there by daylight. But I requested that the reconnaissance patrols be put ashore at Baralulu instead of Rendova and that two boats be left for them to attempt a landing at Zanana in daylight. By this time, I was thoroughly convinced they would never reach Zanana except in daytime, and was greatly perturbed at the thought of searching for it in the darkness and consequently delaying the entire operation.

As we landed on Baralulu, I said to the coxswain, "Do you know that white beach where you were going to put us ashore awhile ago?"

The coxswain shook his head as if he thought he knew, but was not quite certain.

"Where was it?" he asked.

"That was Munda Point we nearly landed on. We were about a mile from the air-strip, and where we were sitting on the water is squarely in front of about a hundred Jap pillboxes with everything in 'em from caliber .25 machine guns to 77mm dual-purpose guns."

It was true. Native information and aerial photos disclosed that the Nips had heavily fortified Munda Point, evidently expecting attack from straight out to sea across Munda Bar. This belt of pillboxes was the reason for attempting to land at Zanana Beach. Zanana was to the east of the left flank of the Jap's positions facing the sea.

The problem of transportation to Zanana had to be solved as the boats returned to Rendova after we disembarked.

After dawn, the reconnaissance patrols scoured Baralulu for native canoes. A thorough search of the island failed to turn up the required transportation, and spirits settled to a low ebb. It seemed a dismal prospect with no assurance of success. The men had just settled down to wait for sunset, when a familiar sound reached them —the friendly purr of Higgins boats. Poking idly along inshore were two of them, apparently undecided as to whether or not to land. A few of the men showed themselves on the beach and hailed the boats.

The coxswains of the two craft were cautious individuals. They remained offshore, circling aimlessly while they carefully scanned the men on the beach. They evidently were suspicious of a Nip trap. Deciding the figures at the water's edge were indeed friendly GI's, they lost no time in getting ashore. Questioning brought forth the information that the two boat crews were thoroughly and completely lost. They admitted that friendly faces looked mighty good to them. The boats were loaded with engineer equipment with which to blast a landing and channel at Zanana. They had been dispatched upon the supposition that Zanana had been occupied by the reconnaissance patrol. Needless to say, when they discovered that no American troops were there they were happy not to have found the place.

The appearance of the two boats was a godsend. It was transportation, but the problem of securing it for our use still remained. The two coxswains were questioned as to the possibility of using the boats to transport our party to Zanana.

It was a deal. It could not disturb anyone's plans to unload the engineer equipment, since it could not be used until a beachhead was established at Zanana. So once more the reconnaissance patrols embarked, this time, in daylight (1115). They were 46 strong in addition to the boat crews, 40 men in the reconnaissance patrols, plus four radio operators with their SCR 284, and an aid man.

During the morning, while the canoe-hunt was in progress, we talked to a native who claimed to have been at Zanana. According to him, it was unoccupied, but was visited by a Jap patrol each morning at about the same time which, from his voluble description, seemed to be 1100. That meant that there probably would be no opposition on landing. Then, too, there would be sufficient time to prepare a welcome for the visiting patrol the next day.

The boats maneuvered slowly and carefully through a myriad of tiny islands and coral reefs for nearly two hours. Finally they reached the scanty, 50-yard stretch of beach for which they had searched so diligently but fruitlessly on those two previous nights. As the two craft stood in to shore, the men scanned the shore line intently, but could see nothing but jungle. Despite this, the men were uneasy, knowing too well that an army could be concealed in that thick bush. Their apprehension was groundless. The boats drove into the beach and the bow-doors dropped. Patrols fanned out silently and swiftly to front and flanks according to plan.

The first beachhead on the Jap stronghold of New Georgia had been established with 46 men!

The patrols, which had moved out immediately upon hitting the beach, reported the area clear of Japs within a 200-yard radius of the beachhead.

The mission was getting under way in earnest. According to the plan of action, the patrols were assigned a diversified task. Their initial job was to find landing beaches suitable for use of troops and equipment in strength. They were then to search for trails down which troops could advance toward Munda, find water sources, and seek out enemy strength, composition, and dispositions.

The first outfit to land was to move in on Zanana by battalions, and go into assembly areas off the beachhead in preparation for a push down Munda Trail to the airfield itself.

With only 50 yards of usable beach, Zanana was unsuitable for landings in force. Elelo, several hundred yards to the south, was a possible alternative, as was the mouth of the Piraka River to the north.

NEW GEORGIA
MUNDA AIRFIELD
LAMBETI PLANTATION
LIAMA BEACH
ROVIANA LAGOON
ZANANA
ELELO
BARALULU ISLAND
RENDOVA
BLANCHE CHANNEL
AMERICAN FORCES
LANDED 30 JUNE
ASSEMBLY AREA
RCN PARTY LANDED 1200 - 2 JULY
RCN PARTY AT ELELO 3-6 JULY
RCN PARTY HQ 9 JULY
RCN PARTY MOVED DOWN TRAIL 6 JULY HIT JAP STRONGPOINT AND WITHDREW TO NAYLOR'S BIV
RCN PARTY AMBUSHED ON TRAIL ONE MILE 10 JULY
ENCOUNTERED HEAVY RESISTANCE & SUBSEQUENTLY TO LIAMA 11 JULY
RETURNED LIAMA 13 JULY
SEARCHED FOR ZANANA NIGHT OF 1-2 JULY
ATTEMPTED LANDING ON BARALULU 30 JUNE RETURNED TO RENDOVA
LANDED ON BARALULU 1 JULY

Since Force G-2 was extremely anxious to secure information on these landing sites, the first task was to dispatch patrols to obtain it. By native canoe, one patrol proceeded to the north along the coast to the mouth of the Piraka River, with orders to leave their canoes at that point and return to the beachhead overland. They were to search for trails, water sources, and potential assembly and dispersal areas to use in conjunction with the possible landing site at the river's mouth. Another patrol proceeded to Elelo by land with the same mission.

I was now getting anxious for the arrival of the native scouts. It was already apparent that the provisional reconnaissance patrols were handicapped by inadequate training in jungle reconnaissance. They had not acquired the knack of reading footprints and other signs, and could not possibly realize and interpret their full importance. However, it was extremely gratifying to see the enthusiasm with which they tackled their difficult job.

At 1600, the patrol from Elelo returned, with the information that there was a trail between Elelo and Munda, and that the Japs had left Elelo.

This was interesting information. The so-called Munda Trail was somewhere in the vicinity. It was known to be the main avenue of travel for the Japs along the south coast of the island. The trail discovered by the patrol at Elelo was apparently the Munda Trail, but it was different from that indicated on available maps. (Similar errors were to occur frequently.) It was necessary to maintain a constant check on maps and sketches and make the necessary corrections.

About 1700 that afternoon, the first of the infantry troops, a battalion, landed at Zanana Beach and dug in for the night. For everyone present, dusk to dawn constituted a nerve-racking, hair-raising experience. It was the battalion's first campaign and the men were green, jittery, and "trigger-happy." During that first night there was a small, intense war in progress. Our side did all the shooting. There wasn't a Jap in the vicinity. When daylight came, the men crawled from their holes, worn and haggard from a sleepless night. The score was four dead and eight wounded, all from friendly fire.

The first item in our business of the day which had to receive attention was the Jap patrol which was in the habit of visiting Zanana daily. We decided to turn the Jap's punctuality to advantage, and a patrol was sent down the trail as a reception committee. The patrol later reported that the Japs appeared on the trail at exactly the expected moment. They were strolling casually through the bush as if it were main street in Tokyo. Their carelessness was fatal. The patrol removed all papers from the bodies for translation by the G-2's language section.

In the meantime, the men not actually on patrol

moved to Elelo, leaving guides to inform returning patrols as to the new base of operations. We had been at Elelo only a short time when the patrol which had gone to the Piraka River the previous afternoon reported in with valuable information. The Piraka seemed to open another avenue into the planned infantry assembly area.

Although information of the coast between the Piraka River and Elelo was now fairly complete, knowledge of trails in the interior and of enemy disposition and movement was scanty. The next move was to correct this deficiency. Reconnaissance teams were sent out with an over-all mission of covering the entire area between Elelo and Munda airfield. One patrol was sent directly to the airfield to secure all possible information of routes leading thereto, and of enemy strength, composition, and disposition on Munda Point. Another patrol started for Bairoko Trail, the supply trail leading from Mundo to Bairoko Harbor on the north side of the island. Their mission was to watch the trail and tabulate all movement to or from Munda. In that manner, a running account could be maintained as to what was added to or subtracted from the garrison there. Patrols also were assigned to terrain reconnaissance. Objective: trails toward Munda over which friendly infantry could advance; second mission, finding water sources. Water supply of troops was a constant problem and information of all sources was vital.

Finally an advance patrol of the South Pacific Scouts arrived and the task of reconnaissance could be performed with ease compared with the heartbreaking effort it required of the relatively untrained patrols.

The terrain reconnaissance was bearing fruit. Knowledge of the interior trails was constantly augmented by patrol reports. Frequent messages were sent to Force G-2 to enable him to make accurate changes on maps and sketches which often were in error.

The little force at Elelo was increased by the capture of their first prisoner of war, a gunner in an airplane which crashed in the water offshore. He obligingly swam to the beach where the men waited to receive him. The PW spoke a little English and, when convinced that no one had immediate intentions of killing him, interpreted the dog tags picked up in the vicinity the previous afternoon. His interpretation later was found to be accurate.

There was no PW enclosure available, and no means of evacuating the prisoner. He spent the night beside a New Zealand Sergeant, and made no effort to escape, apparently deciding that if any worrying was to be done, the Americans could do it. He went to sleep, and much to the disgust of the New Zealander, did not make a move which could possibly be interpreted as being lethal.

On July 5, the remainder of the Scouts came in, and plans were made to relieve the American patrols and return them to their original units. They had done their job well against severe handicaps, and had secured and passed on to Force a very considerable amount of information concerning trails, beaches, water sources, and terrain. It was anticipated that they would continue to perform patrol missions.

By this time, additional infantry units had landed, and were moving into their assembly areas preparatory to driving down the trail to Munda. One battalion had moved south toward the Barike River, and was in bivouac there. Another battalion was still at Zanana.

The next day the Scouts moved to the Munda Trail and prepared to reconnoiter it toward the airfield. It was to be the axis of advance for the infantry.

Landings up the coast from Munda undoubtedly had surprised the Japs. They recovered quickly, however, and were moving their forces to the north and northeast to meet the threat to their flank and rear. The Scouts found definite evidence of this as they moved down the trail toward Munda. Near the junction of the trail and the Barike River, the Japs opened up on us from a ridge with machine guns and rifles and pinned us down. Here I received my second wound of the campaign, a caliber .25 machine-gun bullet through the leg.

The enemy as usual was cleverly dug in and concealed, but the Scouts succeeded in nosing out a series of newly constructed emplacements and pillboxes. A message was immediately sent back to the infantry, and a company was sent up to knock out the strong point.

We had intended to sideslip to the south of the strong point and discover what lay to its flanks and rear. Jap patrols, however, were exceedingly active and numerous. With dusk approaching, it seemed unwise to attempt to pierce the screen before nightfall. Not wishing to spend the night ducking enemy patrols, the Scouts withdrew to the south and east along the Barike, made contact with a battalion in position to the north of the river with its left flank at the river's mouth, and spent the night in the comparative safety of the battalion perimeter.

Next morning, the Scouts moved up the river about a quarter mile to establish a base of operations. Supplies were running low. The wounded had to be evacuated by canoe down the river to the beach at Zanana from which they could be taken out by Higgins boat.

Through the media of patrol reports, a definite picture of enemy operations was beginning to form. The strong point on the Barike and the numerous enemy patrols constituted a screening force to delay the infantry's advance, while a MLR was being organized. Penetrating the screen, the Scouts located and reconnoitered the Nip's main positions one by one. Detailed information was promptly transmitted to Force.

Patrolling was becoming more difficult and dangerous each day. The enemy was thoroughly awakened to the situation, and it was almost impossible to move in the jungle without encountering Japs. All too frequently, patrols returned with a member missing and one or two wounded. They were proving their mettle

in short, vicious skirmishes which characterize aggressive patrol action.

It finally required an entire infantry battalion two days of hard fighting to knock out the strong point which the Scouts had discovered the first day on the Trail. We moved back to the junction of the trail and the Barike and set up a base of operations.

The atmosphere was bristling. The jungle was a hornet's nest of Japs, moving day and night. Patrols watched and reported.

One patrol returned with information of Bairoko Trail. This byway had been the Scouts' bugaboo. It was known that a trail existed between Munda Airfield and Bairoko Harbor to the north. Patrols had repeatedly gone out to find it and report what traffic it carried, but without success. Persistence finally won out, the elusive trail was located and the usual corrections made on all maps. Indications were clear that the Japs were moving out of Munda to north and northeast.

The situation was ripe for a fight. An infantry regiment was in its assembly area, with one battalion on the left, another astride the Munda Trail, and a third in reserve.

Another battalion of infantry was assembled to the north of the trail. Since the action seemed destined to center on the Munda Trail, it was made the axis of patrol activity.

As the situation developed, a change was made in the administration of reconnaissance missions. The writer was relieved from direct command of the Scouts, and was attached as special staff officer to Hq of an Infantry regiment. The Scouts operated under a New Zealand officer, but as liaison officer for Force and Regimental Headquarters I still assigned their missions.

As contact became imminent, the regimental CO became increasingly apprehensive of his flanks and rear, especially the north flank. The south (left) flank, was anchored on a swamp which, at some points, extended slightly north of the trail itself. Any large movement through the bog was improbable as long as the north (right) flank offered comparatively favorable terrain.

On July 9, the Scouts' patrols were providing security for flanks and rear as well as probing at the airfield and the enemy flanks and rear. They also were kept busy orienting the various units as to their relative positions. With visibility often limited to a very few feet by the dense jungle, even a squad leader could only guess where the rear of his squad column or a flank of his skirmish line might be.

On the morning of July 10, the advance down Munda Trail began against light opposition. On the 11th, however, as the infantry approached the junction of the Munda Trail and a trail from Liaina Beach to the south, they encountered heavy resistance. The Japs were well dug in, and defending their positions with grim tenacity. It was immediately apparent that the infantry had hit a stone wall which it didn't possess the strength to breach. The Scouts brought in disturbing reports of the Japanese strength. Commanders had come to place implicit faith in those reports. Reinforcements were an absolute necessity, but getting them was quite another thing.

An Infantry regiment, less one battalion already committed, were coming in through the beaches at Zanana and Elelo. Those unsatisfactory landing sites could not handle more troops. Liaina Beach offered the best landing, but it was the right flank of the strong Jap positions which the doughboys were now battering. If that enemy anchor on the beach could be knocked out, it would mean that reinforcements would have an opportunity to land and strike on the enemy flank. It seemed worth the attempt.

It was decided that the infantry would sideslip to the left and move laterally along the face of the Jap line of resistance to Liaina and secure the beachhead.

The Scouts, doing magnificent work, often pointed out Jap guns and fields of fire into which the doughboys otherwise would have stumbled blindly. They simply could not see through the jungle foliage, and even after an enemy gun had exacted its toll, it was extremely difficult to locate and silence.

The gruelling pace was beginning to tell on the Scouts. Casualties were high and the natives were saddened by the accidental death of one of their officers, a favorite among them. He was killed while directing an artillery concentration on an enemy installation. To compensate for poor visibility, he deliberately crawled to within 30 yards of the target. He brought the fire too close. Despite lack of rest and adequate rations, the Scouts continued to outpatrol the Japs night and day. Nor did their own losses stop them. They were frequently inside Japanese bivouacs. One New Zealander himself spent one night in a foxhole with a Jap soldier. Both were seeking refuge from American artillery fire. The Jap, apparently mistaking the captain for one of his countrymen, grunted a greeting and moved over.

The Japs made their customary attempts at trickery and deception. One time I received a message from Force asking for additional data in support of my urgent request for artillery fire on a certain area. The request, radioed to Force, had been signed with my name, but had not originated with me.

Immediately I was able to advise Force of this attempt at deception by the Japs.

The Japs had requested fire on an American bivouac area.

On the morning of the 12th, I was with the leading battalion in the lateral movement to Liaina. The most direct route to the beach lay through the swamp; therefore, believing there would be little opposition in the swamp itself if they could reach it without interception, I recommended that they follow a compass course directly across it. The battalion was now west of the bulge in the swamp which projected to the north across the trail. Fear that the Japs might react quickly enough

to hit the lateral movement on the flank was well founded.

That afternoon, shortly before the leading battalion reached the swamp's edge, the Japs struck immediately to the rear with a reinforced battalion and succeeded in cutting the American column in two. One battalion, the New Englanders (White Mountain Boys) apparently the Jap's focal point, was receiving intense machine-gun and mortar fire. The two rear battalions were relatively untouched.

Once again, patrol information provided the basis for a change of plan. The Scouts had determined that there was no other large enemy force in the area except the one pouring it on the New Englanders. If this battalion, almost on the edge of the swamp, could keep the Japs engaged, the other two battalions could by-pass to the east and proceed unimpeded across the marsh to the beach.

A message was sent to the other two battalions recommending this course of action, and Scouts to guide them through the swamp were arranged for. The recommendation was accepted. The White Mountain Boys settle down to fighting off the Nips who were inflicting casualties, but not making appreciable headway.

The scheme worked. The other two battalions moved through the swamp and tore the Jap flank off Liaina Beach, thus opening the way for further landings.

In the meantime, the White Mountain Boys dug in preparatory to spending the night of the 12th on the edge of the swamp. The following morning, they pushed into the swamp itself in an effort to disengage. That evening the battalion entered the regimental perimeter on Liaina Beach.

The following morning infantry arrived on the new beachhead. The initial phase of the New Georgia campaign was completed.

Lessons Learned

1. For jungle operations, reconnaissance personnel must have specialized training. It takes more. than guts and enthusiasm for a man to hold up his end on a jungle patrol. He is not worth much without a solid backlog of jungle know-how. If a scout cannot "read sign," he cannot get his job done.

2. Current doctrine pertaining to scouting and patrolling is adequate and sound. It provides an excellent basis for further specialized training. As soon as sufficient information is available, commanders must not fail to conduct training particularized to the areas in which their units are likely to be employed. Training for jungle reconnaissance imposes stern responsibilities on a unit.

3. Since most jungle patrol engagements are meeting engagements, each patrol should be equipped with two or three automatic weapons of the submachine-gun type to deliver a high volume of fire in critical moments. Arming of the patrols on New Georgia presented no particular problem, since each man generally acquired from the wounded or dead that weapon for which he had a preference, or one with which he felt himself especially proficient. Reconnaissance patrols of the 43d Division were armed with M1 rifles and Thompson submachine guns, while the South Pacific Scouts had the caliber .38 Australian Owens gun, the equivalent of our tommy gun, plus an assortment of rifles including M1903, M1917, the M1, and the British .303 rifle.

4. Knives are indispensable. A satisfactory knife may be improvised from salvage metal such as an old vehicle spring, or a discarded file. It should be designed to open up Japs and jungle trails with equal facility.

5. Grenades are first-rate jungle patrol weapons. Scouts in New Georgia often used them to delay pursuit when surprised or ambushed. Scattering like a flushed covey of quail, members of the patrol fired their weapons and dropped grenades as they ran. They would reassemble at a previously designated rendezvous.

6. Patrol formations must be kept flexible because of the restrictions imposed by terrain and visibility. When it was practicable for the flankers to move off the axis of advance, the patrol generally would take up a loose diamond formation with the patrol leader initially in the center. More frequently, however, the patrol moved in a column with sectors of responsibility assigned to each man in order to attain a measure of all-around protection.

7. Patrol leaders have a hard row to hoe in maintaining control of their men. Often, a man cannot be seen standing three feet away. One man cannot control more than four others in heavy jungle without sacrificing speed and flexibility of movement. The use of small patrols helps solve the patrol leader's problem in this respect.

8. Generally speaking. the Jap is a lousy marksman, particularly on moving targets. Move fast and keep moving when fired upon. Fire may be received at such close ranges the opposition's strength may be ascertained by noting the sound of rifle bolts being opened and closed. Even at short range, few Jap riflemen or machine gunners can hit a man who does not give the grass a chance to grow under his feet.

9. The Jap stinks. Like a poisonous gas, he has a distinctive odor. Detection and recognition of it by a patrol member many times will prevent ambush.

10. Knowledge of the natives is essential to proper evaluation of information from native sources. My understanding of the people and the ability to speak the language enabled me to gain much information which otherwise would have been lost.

11. Too much cannot be said in favor of the natives who constitute the rank and file of the South Pacific Scouts. Simple and childlike, they nevertheless possess real courage and determination. In the execution of their tasks, they saved the lives of many American soldiers.

A CAVALRY MECHANIZED SQUADRON IN DEFENSE

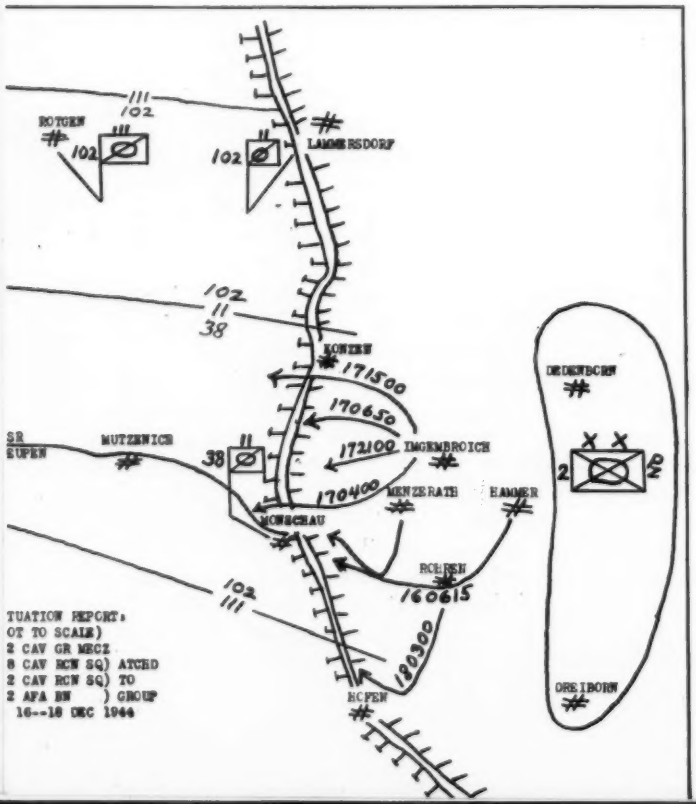
*by Lieutenant Colonel Paul L. Burke**

". . . The scattered cavalry outposts allowed the enemy to approach through these canalized routes until he was on their outer wire defenses. Then, at a given signal, all weapons opened up at point-blank range. In the light of 66mm mortar illuminating shells, the Germans were seen to be in headlong retreat back along the Rohren and Hammer roads."

PRIOR to and during the period of the "Belgian Bulge," the 102d Cavalry Group held dismounted defensive positions on the northern shoulder of the break-through area. At the beginning of the German offensive the 38th Squadron was subjected to, and successfully withstood, repeated attacks. The squadron eventually received a Presidential Citation for outstanding, courageous execution of its mission—"to hold its ground."

The successful action of the squadron had been credited to farsighted and complete "organization of the ground for defense," as well as to the individual and collective heroism of its members.

*Dept. of Tactics, The Cavalry School. Formerly Executive Officer, 102d Cavalry Group.



For five weeks preceding the German attack the squadron, under Group supervision, worked tirelessly and ceaselessly to prepare its sector for defense. Fields of fire were cleared. Machine-gun positions were prepared and occupied. Mortars, organic assault guns, and the guns of attached self-propelled artillery battalions were registered in accordance with detailed defensive fire plans. Great quantities of antitank and antipersonnel mines were laid. Defensive concertina wire, well booby-trapped, was emplaced. An endless number of trip wires attached to flares and explosive charges were strung out. Listening and observation posts were established and maintained; and dismounted patrolling, both day and night, was continuous. How well these efforts were rewarded is indicated in the following paragraphs.

Defense of Monschau Sector By 38th Cav Rcn Sq

Specific Data*: During December 16, 17 and 18, 1944, the Germans launched a full scale offensive in the Monschau sector in an effort to secure the Monschau-Eupen highway for future mechanized operations of the 2d Panzer Division, then assembled in the Dedenborn-Dreiborn area. The 38th Cavalry Reconnaissance Squadron (Mechanized), defending this sector with a strength of about 700 men and officers (less attachments), occupied a line on a front of over 9000 yards, from the town of Monschau (inclusive) to Lammersdorf (exclusive). All elements of the squadron, then on its 107th consecutive day of enemy contact, were employed facing the fortified positions of the Siegfried Line less than 1000 yards away. The 3d Platoon, Company "A," 112th Engineer (C) Battalion was attached to the squadron as well as liaison and forward observer parties from the 62d Field Artillery Battalion, then attached to the 102d Cavalry Group.

On December 13, 1944, the 2d Battalion, 16th In-

*Extract from an informal historical report.

fantry Regiment, was withdrawn from supporting positions astride the Monschau-Eupen road and the squadron became the only unit in this sector between the German lines and V Corps Headquarters located in Eupen. During the period December 13-14-15, 1944, there was a marked increase in enemy activity. The attached engineer platoon was employed constantly, day and night, strengthening the squadron's defensive wire, mine and flare fields. The fire missions of Troop "E" (Assault Gun Troop) and of the 62d Armored Field Artillery Battalion increased about 30%. Additional listening posts were established well in front of the squadron line.

On the night of December 15-16, 1944, much enemy air activity was noted over the squadron area, accompanied by an unusual use of pyrotechnics. Reports of German paratroop landings began to filter down from higher headquarters, and all personnel waited the coming of daylight, on December 16, 1944, in a state of tense and alert expectancy.

December 16

On December 16, 1944, the enemy struck. During the three-day period which followed, the Germans made five desperate attempts to penetrate the squadron lines and secure the Monschau-Eupen highway. These attacks ranged from a frontal assault, in battalion strength, to combined frontal and enveloping attacks employing elements of two regiments (751st and 752d Regiment, 326th Volks Grenadier Division).

Early on the morning of December 16, 1944, the enemy preceded his attack by a 35-minute artillery, mortar and rocket barrage of unprecedented severity. It was an obvious and effective attempt to isolate the Monschau sector by fire; all telephone communications were destroyed and the main supply route denied by a series of time-on target concentrations, which were followed throughout the day by severe interdictory and harassing fires.

At 0615A the enemy attacked Monschau from the east in battalion strength, employing both battalion and regimental support weapons. The thinly spread tank and reconnaissance platoons met and repulsed this numerically superior force in complete darkness. On the southeast of the town, noncommissioned officers, of necessity commanding the defenses of these strategic approaches, displayed outstanding combat proficiency. The approach of a company of enemy infantry from Menzerath, Hammer and Rohren was detected only a few minutes before contact was established. Coolly, and with grim determination, the scattered cavalry outposts allowed the enemy to approach through these canalized routes until he was on their outer wire defenses. Then, at a given signal, all weapons opened up at point-blank range. In the light of 60mm mortar illuminating shells, the Germans were seen to be in headlong retreat back along the Rohren and Hammer roads.

Simultaneously with the above attack, a larger enemy force concentrated on the high ground east and northeast of Monschau, and deployed to attack from the dragon's teeth and the "snake road" leading from Imgenbroich. Here the enemy assaulting infantry was pinned down by machine-gun fire from squadron trench positions in this area until forward observers from the squadron assault-gun troop and the 62d Armored Field Artillery could adjust on the target. In this manner the German attack was broken up at ranges of from 200 to 600 yards. The enemy was unable to close with the lightly held line and the attack was repulsed. At 0745A, coming from the Menzerath Hill in stronger force, the enemy partially succeeded in driving a wedge up the bed of the Roer River and within the cavalry outpost. The force of this attack was broken largely by the fire of a machine gun dismounted from one of the tanks defending the draw, reinforced by tank fire.

For the balance of the day the Germans kept up strong patrolling and sniper action. The squadron employed artillery fire and aggressive patrol action to prevent and break up the assembly of enemy troops on the squadron front. Observation posts and outposts reported the filling of pillboxes by the Germans and all intelligence pointed toward another attack to come. Every effort was made to bolster the squadron's thinly spread defense and immediate reinforcement was requested from the 102d Cavalry Group. Company A, 146th Engineer (C) Battalion was attached and reported to the squadron commander at about 1700A December 16. Two engineer platoons were attached to troops in the line and a third dug in supporting positions on the high ground west of Monschau, in Squadron reserve.

Again, the night of December 16-17 was marked by unusual enemy air activity and the use of many varied types of pyrotechnics. Large, low flying enemy airplanes passed over all troops; flying from east to west and returning, some dropped flares and others carried wing lights. Patrols and listening posts were put out in greater numbers, and indications of enemy troop movement were reported during the night.

December 17

At 0400A, on December 17, a listening post just west of Menzerath detected a large body of enemy approaching from that town. In the darkness, the listening post was very nearly overrun and the personnel were forced to engage in a fire fight for their own self protection. Although faced with tremendous odds, they maintained their vantage point and by radio adjusted artillery fire which inflicted severe casualties, and forced the enemy to withdraw.

Two and one-half hours later the enemy again attacked, accompanied by a repetition of the previous day's preparation barrage. Initially, three battalions attacked on all troop fronts from Monschau to Konzen

and, simultaneously, enemy paratroopers of Colonel Von der Heydte's German paratroop regiment became active in rear of the squadron lines. The main attack developed, in regimental strength, to the north of Monschau in an effort to gain the dominating Mutzenich Hill and sever the Monschau-Eupen highway. Other points on the squadron front were subjected to strong and well-organized assaults by forces ranging from company to battalion strength. Enemy small-arms fire became severe and all advances by the Germans were supported by direct as well as indirect artillery fires.

In successive waves, the numerically superior enemy drove against, among, and through the beleaguered cavalry positions.

The squadron's light tanks defending the northern approaches to Monschau met the first thrust of the German attack just before dawn. Gaining the element of surprise by virtue of their well-camouflaged positions, the tankers skilfully employed every available weapon and effectively turned back over a company of the enemy. Heavy casualties were inflicted and an early attempt to sever the corps MSR at this point was denied.

As the attacking German infantry pressed north of Mutzenich, they commenced to infiltrate among the small farms on the outskirts of the town. Outposts were partially cut off and subjected to flanking fire. Fighting in small groups, these men refused to give ground which would have further exposed their comrades. Strong points were established by as few as four men and tenaciously held out while one hard-pressed platoon, which had had its line penetrated, counterattacked to restore its positions. Armored cars were employed to attack the advancing enemy and the German wedges were effectively driven out.

At one point the Germans succeeded in crossing the main supply route, at the northern edge of Monschau, under heavy supporting fire and established a machine-gun position within the squadron defensive positions. As in the several other instances of this nature, the cavalrymen held their ground, and the enemy position was eliminated by four tank crewmen who flanked and charged the German machine gun with small arms and hand grenades.

Forward observers, both from the Squadron Assault Gun Troop and from supporting artillery units, were mainly instrumental in breaking up the formation of enemy support and reserve troops which followed the main effort of the attack. All of these forward observation parties were forced to engage in fire fights at one time or another, in order to maintain their positions and protect themselves and their equipment.

North of Mutzenich, where five reconnaissance platoons defended a front of 6000 yards, the Germans achieved a penetration in force. More than 65 of the attacking infantry gained the dense forest behind the cavalry positions, and elements of the German paratroops dropped the preceding night also engaged the desperately fighting platoons from the rear. Observation posts of the 62d Armored Field Artillery, 186th Field Artillery and the 955th Field Artillery Battalion were overrun by the advancing Germans. Despite these numerous and formidable enemy threats, all lines and positions were maintained with grim determination and existing gaps sealed by employment of the attached engineers. Later in the day, added reinforcements in the form of Company A, 47th Armored Infantry arrived and deployed in the heavily wooded area of the break-through to clean up all enemy resistance in this sector. These reinforcements later joined forces with the cavalry and assisted in strengthening their lines.

At the height of the enemy's main effort, and as German support battalions commenced to move up in the area north of Mutzenich and Monschau, all available personnel were turned out to provide last-ditch security. Rear echelon maintenance and supply sections were employed as command post security and prisoner of war guards. Soldiers being treated at the squadron aid station, adjacent to the command post, were directed to rejoin their units. All prisoner of war statements indicated that an armored attack by the 2d SS Panzer Division was to follow the infantry assault that same day and the squadron prepared to hold at all cost.

From 0650A to 1500A the fighting continued with tremendous odds being thrown against the cavalry front. Gradually the platoons gained local control and artillery observers were enabled to place accurate fire on German troop concentrations as well as on routes of approach and supply.

At 1500A the beaten enemy commenced to withdraw under the constant pressure of artillery, mortar, tank and machine-gun fire. Two hours later the reinforcing infantry troops (Company A, 47th Armored Infantry) who had been cleaning up in the woods west of the squadron, came through and were integrated among the platoons for the night. Ten medium tanks were also placed in support of the line. The squadron, still in its original positions, consolidated for the expected armored threat.

As darkness fell, listening posts were put out, and patrols sent into enemy territory. At 2100A the Germans struck again. A large enemy force was detected approaching Monschau from the vicinity of Imgenbroich and was immediately illuminated by flares and 60mm mortar illuminating shells. In the resulting light approximately 200 Germans were taken under fire by the squadron's forward observers, and by tanks and machine guns. The engagement lasted for approximately 45 minutes, after which the enemy withdrew again with severe losses. At 2230A listening posts reported the approach of large numbers of troops from the direction of Imgenbroich, and again heavy fire was placed on an estimated 100 of the enemy, under the light of the 60mm mortar illuminating shells. Many casualties were observed and the German attackers dispersed.

December 18

At 0300A, December 18, an intense enemy artillery and rocket barrage fell on the Monschau and Hofen areas, which preceded an attack on the 395th Infantry defending Hofen Hill just south of Monschau. An estimated reinforced German battalion, followed by tanks, attempted to envelop the Monschau area from the south in a third desperate maneuver to seize the Monschau-Eupen road. Right flank elements of the squadron south of Monschau and on the Hofen Hill were engaged by enemy direct artillery fire and infantry action. At 1000A, the Germans had achieved a penetration among the infantry's positions, and units adjacent to the cavalrymen were withdrawn to be used elsewhere in a counterattacking rôle. Simultaneously, the weakened left flank of the infantry was subjected to a frontal attack. Marshalling their scant forces, the cavalrymen filled the gap and assisted in repelling this attack by the coördination of all available weapons including artillery.

Despite the terrific pressure under which the squadron fought against a numerically superior enemy, all elements maintained complete control and communications throughout the three days operations. This communication involved the maintenance of over 50 miles of telephone wire, 65 telephones and six switchboards, for which no personnel are assigned or trained within a cavalry squadron. In addition there were 16 active radio nets, incorporating approximately 63 radio sets. As a result the squadron commander was enabled, at all times, to present a clear and comprehensive picture of the situation to the cavalry group commander, and to conduct a coördinated defense.

The successful defense of the wide sector entrusted to the 38th Cavalry Reconnaissance Squadron (Mechanized) was due to the spontaneous, intelligent and combat wise performance of a great number of small groups of men. With every platoon committed, without supports, and with only an engineer platoon in reserve, it was the heavy sense of responsibility and the combat skill of each man on the line which maintained the integrity of the position. In the performance of its mission over the period of December 16-18 the 38th Cavalry Squadron (Mechanized) displayed outstanding performance of duty in action against the enemy and achieved a brilliant success in stopping the full scale German offensive in the Monschau sector. The significance of this is best brought out by the statement of Major August Braunwarth, commanding the German 54th Werfer Regiment, who was captured on January 13, 1945, at Mont le Ban, to the effect that: "We failed because our right flank near Monschau ran its head against a wall" (First U. S. Army PWI Reports January 15, 1945).

Ammunition Used in Europe*

The machine gun, cal. .30, threw more lead in Europe from D-Day to VE-Day than any of the other small arms used by the Ground Forces—392,088,000 rounds, according to Ordnance Department figures. Next was the M-1 rifle with 241,885,000 rounds. Surprisingly, the .45-cal. automatic pistol accounted for 97,369,000 rounds as against 11,310,000 fired by the BAR.

The Ordnance Department listed the ammunition expenditure as follows:

Carbine, Cal. .30	130,022,000
Rifle, U. S Cal. .30 M1903	56,164,000
Rifle, BAR Cal. .30 M1918A2	11,310,000
Rifle, U. S. Cal. .30 M1	241,885,000
Gun, Machine Cal. .30 Ground	392,088,000
Pistol, Auto. Cal. .45, M1911A1	97,369,000
Gun, Machine Cal. .50 BB Blex CB	105,619,000
Mortar 60mm M2 W/mount	4,881,196
Mortar 81mm M1 W/mount	6,324,249
Gun 37mm AA (Carr Mtr Mult Gun M 15A1	467,814
Gun, 37mm AT Wheeled	1,170,081
Gun, Auto. 40mm AA	1,153,156
Gun, 57mm M1 Wheeled	631,080
Gun, 75mm Tank	2,003,952
Carriage Motor 75mm Howitzer M8	1,604,617
Carriage Motor 76mm Gun AT M18	972,650
Carriage Motor 3-in. Gun M10	1,639,780
Gun, 90mm AA Mobile	1,022,141
Carriage, Motor 90mm Gun, M36	424,741
Howitzer, 105mm Field M2A1	16,808,080
Howitzer, 105mm M3 (Short Barrel)	1,972,349
Howitzer, 155mm M1 M1918	4,548,526
Gun, 155mm Field M1A1	1,395,224
Gun, 4.5-in. M1	694,234
Howitzer, 8-in. M1	484,523
Gun, 8-in. Field	41,652
Howitzer, 240mm M1	82,494
Fuses for separate Loading Ammunition	8,830,681
Launcher, Rocket AT 2.36-inch (Bazooka)	1,310,823
Rifle-Grenade, Total	1,817,757
Mines	1,856,234
Torpedo Bangalore	73,734
Hand Grenades, Total	4,853,888

**Army and Navy Register.*

HARASSING

by Major Thomas J. Brett*

DURING the period of December 1, 1944, to March 31, 1945, many cavalry units were placed in static situations, relieving infantry divisions on the Roer, and later on the Rhine. Infantry missions gave the cavalry an opportunity to demonstrate its flexibility in assuming and efficiently completing another type of difficult mission. One of the outstanding features of the new assignment was its initiation of a harassing program on both the Roer and the Rhine.

The 36th Cavalry Reconnaissance Squadron had three German 75mm towed guns and one U. S. Sherman tank that, although disabled, could be pulled into position. This made 4 guns available. They were placed in position during the night and, with ammunition which had been gathered from various sources, began shelling the small enemy held towns across the river. Cavalrymen without artillery experience operated the guns with the simplest type of fire control. Their fire nevertheless greatly harassed the garrisons, CPs, and installations in the small towns, and at no time was German counterbattery fire received.

Tanks

During this stage of operations the Germans were very wary lest a tank attack be launched from the American sector. It took only the noise of tanks running down the road near the front to set the German artillery and entire defense into high activity. Before harassment runs were made by tanks it was necessary that careful coördination be made with all adjacent units and artillery; every man of our own troops had to be notified of the time that the tanks would move, and the exact route to be taken. A careful reconnaissance of the route also was made by the tank commander to spot shell holes, piles of debris, and to brief road blocks. The first and second run of the tanks was made buttoned up as the enemy was expected to heavily shell the critical road junctions at which he would be able to hear the tanks passing. The third run was made with the turrets open, because it was discovered that the enemy was always three to 10 minutes late in placing his artillery to intercept the tanks. These runs were always made at night to restrict enemy observation, and they were very effective as the enemy remained stirred up for hours after them and expended hundreds of rounds of ammunition.

Four .50 caliber machine guns or 4 water-cooled .30 caliber machine guns in battery were used in indirect fire against known enemy towns and installations to disrupt the routine of everyday procedure. This made the enemy miserable while resting, messing, and travelling to and from installations.

We learned of the exact locations of the enemy CPs, messes, stables for cart horses, motor pools, routes of relief, routes used by carts bringing up hot meals, and artillery positions. Through indirect fire method and observation of strike these known locations were continually harassed by three to 4 batteries of machine guns. Alternate and supplementary positions with adjoining trenches were essential. Ten men were used in each battery, two men per gun, an officer or NCO in charge, and an OP. All work on installation was done at night, but actual firing took place in the daylight, as it was learned that the enemy was very alert during hours of darkness but used the daytime to rest and mess. The results of this type of firing were verified when captured POWs related a story of a continual hail of bullets around the towns and routes that they were forced to use. Many German soldiers even went without their meals for 24 to 48 hours.

Silence

Another method of harassment was used by the entire XIII Corps during January, 1945, on the Roer. At certain times all guns of the corps and its supporting troops ceased firing for 31 hours with the exception of shots fired at infiltrating Germans or by Jerry himself. One can imagine the thoughts of the enemy during this silence, especially since he was expecting two or three rounds of artillery on his position for every round that he fired into the American sector.

At 0700, after 31 hours of silence, all guns including artillery, machine guns, mortars, and rifles, opened up on every known enemy position. A heavy smoke screen was placed on their OPs and for 20 minutes this mighty bombardment continued.

At 0720 all guns ceased firing and for us the show was over; but the enemy remained energetic through the rest of the day, firing salvo after salvo at non-remunerative targets. It was later learned that every individual Jerry was on the alert in a defensive position throughout the remainder of the day.

Combat patrols of from 4 to 40 men were organized. Each patrol was carefully planned and S-2s of the group and squadron supplied all available information. Members of the patrol were excused from any other duty to prepare and plan for their one mission. The subject of combat patrols has been well covered in previous articles, therefore the writer will not go into the details of their planning. A number of these combat patrols, which infiltrated through enemy lines, and harassed the enemy over a 10-day period kept the enemy front line troops critically "on edge" at all times.

Loud Speakers

The use of loud speakers for propaganda and harassing of the enemy should be carefully planned. Al-

*Executive Officer, 11th Cavalry Group.

though the following plan was not used by the cavalry it was used by other units and should be included here. Before the actual use of the loud speaker the following information about the enemy must be obtained: pinpoint positions of enemy troops in line, and of each enemy emplacement; and the names of individuals manning those positions. In many cases this is possible by POW interrogation. Preferably a pillbox or well fortified position should be selected for the loud speaker. The broadcaster should say something like this (with embellishments, of course, in German): "We are giving you the opportunity to surrender. If you do not we are going to destroy you. We know your exact position and we know every man in that position. For instance: Corporal Willie, we know that you are in a pillbox, in a grove of trees near the big bend in the river. To prove it we are going to destroy you and your pillbox." All artillery in the sector will have been previously coördinated to fire on that one pinpointed target and will proceed to destroy the position and annihilate the enemy. On cessation of fire the propaganda should immediately continue: "Sergeant Hans, you are next. We are giving you 10 minutes to surrender. If you do not surrender by that time we will destroy your position and all of your men as we have just destroyed Corporal Willie's position." The announcer should then go ahead and warn other positions of their destruction if they refuse to surrender. The writer knows of the very effective use of this system in the Brittany campaign by the 66th Infantry Division. The use of loud speakers, however, to emphasize our power and numbers without such prior planning as described above, should be discouraged.

Artillery

In the harassing program, artillery was used at intervals throughout the day and night on critical road junctions, towns, routes of communication, and known OPs. Detailed schedules of fire for each gun and each target were initiated by the corps artillery and proved very effective. The use of artillery to lay a smoke screen just in front of the enemy lines at odd times not only aided in the harassment of the enemy but provided concealment for American forces when they crossed the river to attack.

Pyrotechnics

Pyrotechnics were never used to full advantage by the cavalry in its sector. They can be used effectively; but again, as in any other program, must be carefully coördinated and planned.

White phosphorus flares were used extensively by units in the entire front line sector at all times during the hours of darkness to deny the enemy free movement in his own sector.

High Velocity Weapons

When it was known that the enemy had a strongpoint in a pillbox or in a large, thick-walled building that could not be destroyed by normal artillery fire, towed tanks were brought up during the night to a prearranged and prepared position. At first light the weapon was boresighted on the enemy strongpoint and the crew fired the high velocity gun "rapid fire" for 5 to 10 minutes. The crew then scrambled to a prearranged basement or shelter, leaving the gun in its position, as the German artillery, both high explosive and time fire, soon begin arriving in quantity on the spot.

The result of this type of harassment is doubtful, although it caused consternation among the enemy who were sleeping or on duty in the strongpoint. It boosted the morale of the men in our own sector, who generally had a "hate" for any German strongpoint. The crews of the tank destroyers came away after having had the "time of their lives," and enjoyed the entire mission.

The same procedure was used across the Rhine during the hours of darkness, but in this instance we exploited the quadruple .50 caliber guns of the AAA. The enemy at the time was very alert to the landing of our patrols on their side of the Rhine, and when the patrols landed the entire enemy defensive sector would fire and expose their positions. At this time the quadruple .50's of the SP AAA, which had been driven up behind the dike during the early hours of darkness, were moved up to the edge of the dike. They opened up and grazed the opposite side of the river dike and road with concentrated bands of fire. Again it is not known whether this procedure materially aided the harassing program, but the morale value to our own troops and the good that it did the AAA to actually fire from front line positions was worth the effort.

Summary

For the initiation of a harassing program, a definite purpose should be established. In this case, the Battle of the Bulge was being fought to the south. The line of American troops in the north was being held very thinly, as evidenced by a cavalry group being called upon to relieve an infantry division. It was the aim of the higher command to keep as many of the enemy troops on our front as possible, in order to prevent the German command from sending them to the south to reinforce the enemy in the bulge. Harassing not only held enemy troops on our front, but kept them in such a condition that they were able to inflict far fewer casualties when the crossing actually was made.

The harassment program was highly successful in concealing the direction of the main attack on the Rhine. The American forces were scheduled to cross at Wesel, but the harassment indicated that the crossing would be made just south of Düsseldorf. In order to reinforce his front where the harassing program was carried out; the enemy was forced to withdraw crack paratroops from the north where the Allied attack actually occurred.

Cavalry in River Crossings*

ABOUT a battalion of German infantry, supported by about eight artillery and mortar batteries, defended the line Hill 105.3–Hill 102.6 (see sketch).

Our cavalry division, after completing a 70-kilometer march, had assembled in the woods north of Dymarka by 1200. The division's mission was to force a crossing of the Dnieper in the Dymarka-Nedianchichi sector, and, by attacking north along the right bank, to establish and widen a bridgehead, thus securing the crossing of the corps.

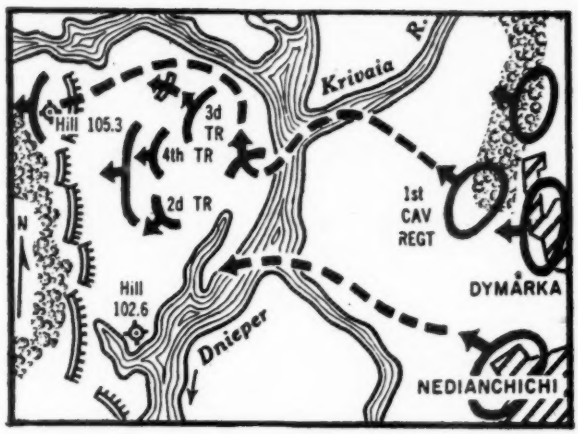
The right bank of the river with its low hills, swamps, and thick shrubbery enabled the enemy to maneuver his reserves in the depth of his defenses. The left bank, sloping in places, was also overgrown with shrubs. In the sector designated for the crossing, a small river, the Krivaia, joined the Dnieper. Because of this, it was possible to concentrate here a large number of crossing means. The irregular bank with numerous indentations was also overgrown with shrubs, and this facilitated the outfitting and preparation of troops.

The river was up to 800 meters wide, and its current was between one and a half and two meters per second. Thus, a raft with a load capacity for a squad would cross the river in about 40 or 50 minutes.

To capture a bridgehead on the opposite bank, the commander decided to use a strong advance force composed of a cavalry regiment and mortar and antiaircraft batteries. It was to be supported by the entire artillery. The bridgehead was to be established in the area east of Hill 105.3–Hill 102.6. The crossing was to be made west of Dymarka in the evening of the following day, and without artillery preparation. The artillery and heavy machine guns had to be made ready for night firing, which was to start on signal from the advance-force commander. The 4th Troop was to cross the river in one trip. It was charged with providing security for the crossing force, clearing the right bank of the enemy in the area of the crossing, and reconnoitering his defenses in depth.

This decision of the division commander was made in conformity with the situation. The Germans defended the river in considerable strength and had powerful fire support. Only a strong advance force could destroy the enemy's combat outposts, wedge into the main line of resistance, and capture and consolidate Hill 105.3, thus securing the crossing of the main forces of the division.

The regiment was to cross at night so that it could attack the enemy in darkness before dawn. This insured the secrecy and surprise of the action. For the same purpose, it was decided to do without artillery preparation. Artillery fire was to be employed only for the protection of the landing and the advance.



The division had 210 Iolshin bags [probably special inflatable bags for crossing operations.—Editor]. These were used to build 27 rafts with load capacities ranging from 300 to 1,300 kilograms. Thirty more rafts of similar capacity were built from crossing materials obtained locally. The rafts were supplied with ropes to be used for pulling them upstream on their return trips.

The crossing was very carefully organized. The paths leading to the crossing points were staked. The troops moved from the departure area in small groups along specially marked lanes, with road markers stationed all along the way. This secured their speedy and simultaneous arrival at the crossing point.

Two oarsmen were detailed to each raft, and one company-grade officer (sapper) was placed in charge of each 10-to-15-raft group. All raft and raft-group commanders were informed where to load the rafts and where to land on the other side. In order to avoid mixing the crossing units, various terrain features on the right bank of the river were used as reference points.

The troop started moving from its departure area when darkness set in. Marching in absolute silence, it reached its embarkation point southwest of the Krivaia River. By this time the sappers had prepared 17 rafts and nine boats. It took 20 minutes to load the troop. Each raft was accompanied by two sappers who were to bring the rafts back.

The rafts and the boats were now out in the river. Low visibility helped conceal them. In 45 minutes the troop had crossed the river and halted within 40 or 50 meters from the bank. The men jumped off and waded ashore. The German combat outposts were not prepared for the cavalrymen. In a brief engagement the enemy was almost completely annihilated. Having reached the southeastern slopes of Hill 105.3, the troop dug in and sent a signal to our side of the river.

At this time the German mortar batteries opened fire on the rafts and boats stuck on the shoals. Simultaneously, heavy machine-gun fire from Hill 102.6

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*_Military Review_. Translated and digested at the Command and General Staff School from a Russian article by Colonel I. Baev in _Krasnaia Zvezda_ (Red Star) July 3, 1945.

destroyed eight rafts and two boats. Our artillery, however, firing from the east bank, neutralized the enemy's mortars and machine guns.

The second troop with two mortar platoons started crossing over an hour and forty minutes later. This group used two small pontons, eight rafts made from Iolshin bags, and 12 rafts built of locally available materials. Upon reaching the shrub-covered area three kilometers northeast of Hill 102.6, the troop was counterattacked.

A strong wind slowed down the rafts on their return trip. The third trip, therefore, was delayed a little. This time it was the 3d Troop with a platoon of 45mm guns and one of 82mm mortars. The crossing equipment consisted of a raft made of two pontons, 12 small rafts (Iolshin bags), and seven boats and seven rafts built of local materials. The troop crossed the river and reached the shrub-covered area two kilometers northeast of Hill 105.3, where it was also counterattacked. This counterattack was supported by artillery and mortars, and by machine-gun fire coming from Hill 105.3. But with the support of our artillery firing from the left bank the troops repulsed the counterattack.

By dawn the whole regiment had crossed the Dnieper and had reached a nameless hill 500 meters east of Hill 105.3 and had dug in.

The 2d Regiment started crossing at 7 o'clock in the morning. The German mortar fire continued and was later augmented by aerial bombing. In spite of this the regiment reached the right bank, assaulted the enemy defending Hill 105.3, and soon captured it. During the night the regiment repulsed several German counterattacks. Meanwhile, the 3d Regiment's crossing was going on according to schedule.

Units of the adjacent infantry division crossed north of the cavalry. Both the divisions attacked and, repulsing counterattacks, succeeded in clearing a bridgehead 15 kilometers long and eight kilometers deep.

What lessons were learned in this crossing? First of all, it showed once more that it is possible for cavalry to cross a wide water barrier employing crossing means improvised from materials found in the vicinity of the crossing. It also proved that it is essential to become familiar beforehand with the nature of the water barrier, the surrounding terrain, and the character of the enemy's defenses.

All crossing requirements must be figured. When crossing materials are not available in sufficient quantity or cannot be delivered in time for the crossing operation, a scouting party is immediately organized to find such materials in the surrounding country.

The correct selection of the crossing point is very important, particularly when there is an insufficient number of supporting means and heavy artillery pieces or a shortage of ammunition. If this is the case, flanking and oblique fires from machine guns, mortars, and artillery are organized over the crossing front. These fires should prevent the enemy from counterattacking the units crossing the river. Stretches of the river bent in toward the attacker are most favorable for such fires.

When crossings of broad rivers are forced with the use of local materials only, the operation should be carried out at night with or without artillery preparation, depending on the situation. Night crossing without artillery preparation is possible only when the enemy's defenses are weak and when they are located far from the opposite bank. In all other cases, crossing at night or before dawn should be preceded by artillery preparation, and the crossing of the first echelon should be completed by dawn. This is done to enable the troops to engage the enemy during daylight.

If the enemy has been disorganized and has not had time enough to consolidate his positions, the river should be crossed immediately by the advance echelon, which will use organic and local crossing materials.

If the main line of resistance is far from the river and the latter is defended by combat outposts only, the crossing should be carried out at night. During the night, the outposts should be knocked out, the main body of the division crossed, and contact with the main line of resistance established. The assault should start at dawn after an artillery preparation.

In instances when the attacking troops have a considerable artillery superiority, it is to their advantage to start crossing the river before dawn so as to enable the first combat echelon to complete the crossing in darkness. The subsequent crossing and the development of the attack are made secure by the support of the artillery and air force.

The element of surprise is the most important factor in the success of river-crossing operations. This is achieved by secrecy of preparations and by demonstration action (dummy crossings). For the same purpose, it is recommended to cross over on a broad front and simultaneously from several points. Narrow-front crossing and the use of a single point for crossing are to be avoided by all means.

All enemy fire means near the river or flanking it should be neutralized by the time the crossing begins. It is also important to protect the crossing area by all available fire means, including antiaircraft artillery and airplanes. Once the crossing is begun, it must be continued with energy, persistence, and resoluteness. If the crossing is held up at one point, it must be shifted to the point where it is more successful. No crossing should be repeated where it has failed.

Cavalry horses, even well trained, cannot swim across a river which is 500 or more meters wide and has a medium current. In the above example only three horses out of the best five selected swam across.

Amphibian Tank Battalion in Combat

*by Lieutenant Colonel James L. Rogers**

Signal Corps Photo

Leaving their LSTs near Okinawa, "alligators" head for Ie Shima, a few thousand yards from the main island.

The Kwajalein Operation

ON its arrival at a camp 30 miles northeast of Honolulu in December, 1943 our amphibian tank battalion joined in the preparations that were being made for an assault landing. The battalion was attached to the 7th Infantry Division, then in training for an amphibious assault in the Central Pacific.

Less Company D, which had been attached to the 27th Infantry Division, the battalion bivouacked for two days near the camp, which at the time was so crowded with units in training that room was not immediately available.

The division's original plans had not called for the use of amphibian tractors, but reports from the Tarawa and Macon Islands campaign indicated that the assault troops should be transported ashore in them in order to insure the complete success of the operation. Few tractors, and no trained personnel were available, however, and so provisional tractor groups were formed from the three antitank companies of the division's three infantry regiments. Operation plans were made, and an intensive program was inaugurated, for there was little time for training before the coming operation.

Organization and Equipment

The formulated provisional amphibian tractor battalion consisted of 4 provisional tractor groups, one amphibian tank company, and a headquarters and headquarters detachment. Three of the provisional tractor groups were to be formed from the antitank companies, and one was to be made up of personnel from the battalion. Each group was composed of approximately 150 men and equipped with 34 tractors. The tank company was to have 17 tanks.

A tractor battalion en route to this area began to arrive, and with their vehicles made available, each company was equipped with 14 LVT A2s and 20 LVT 2s. The A2s were to make up the first, and a part of the second waves. A company, composed of two platoons of 17 tractors each, would be transported on two LSTs.

*Commanding Officer.

Each platoon was broken down into two waves of 8 tractors each, leaving one extra tractor to serve for command or air-ground liaison. Each company then was composed of 4 waves of 8 tractors—each with two free additional tractors—and was set up to carry the assault troops of one battalion. The battalion was to be loaded on 9 LSTs, 8 of which would carry tractors, and one tanks.

The heterogeneous nature of this provisional battalion made it quite difficult to ready it for embarkation. But so little time was left that everyone concerned coöperated, and in 8 days the part of the unit that was to accompany us had completed training and was supplied with vehicles and equipment. The other provisional LVT groups also had been supplied.

A shortage of 500-series radios had created quite a problem in the communication plan. Originally each company command tractor and each platoon leader was to be equipped with an SCR-508, and each wave leader with an SCR-510 radio. Since the amphibian tanks already were equipped with Navy TCS-5 radios, however, it was planned to use them for tank company communication. Four SCR-510s finally turned up and were parcelled out to the tank company, which gave the company commander and each platoon leader one in addition to their TCS-5. It was necessary, however, to use the TCS-5 for intraplatoon communication.

The battalion was assigned 6 FM channels for use by battalion command and company, and one CW channel for the tank company platoons. Another channel, the LVT common, was later assigned personnel who had anything to do with the control and landing. This later proved the most useful channel in the operation and made it possible to talk to practically any person or unit. Communication during this operation was excellent, considering the limited time for radio installation. During the operation the commanding officer was constantly in contact with at least one or two radios in each company.

The built-in intercommunication system on the vehicles was not adequate because it was impossible to use army equipment with naval installations. It was necessary to completely re-wire the vehicles for army microphones and headsets. All electrical equipment was water-proofed and gave little or no trouble.

A number of modifications were made to the vehicles and equipment. Two .50 caliber machine guns were mounted on the cab rail, and shields were improvised for the protection of the gunners. Sandbags were also placed on top of the vehicle as added protection for the crews. A .30 caliber machine gun was mounted on each side of the vehicle. Flame throwers (which later became waterlogged and useless) were installed.

The crew of the LVT A2 was made up of 7 men, including a driver, an assistant driver, 4 machine gunners and a tractor commander. The LVT 2 crew was made up of three men—a driver, an assistant driver, and a vehicle commander. Since the weapons of the LVT 2s were not to be fired except at point targets and on direct orders from an officer, the infantrymen in the vehicles were to man the guns. The crew of the LVT A1 was composed of 7 men—a driver, an assistant driver, two scarf gunners, a 37mm gunner, a tank commander, and an extra man who would serve as an ammunition passer or a replacement for any crew member who became a casualty.

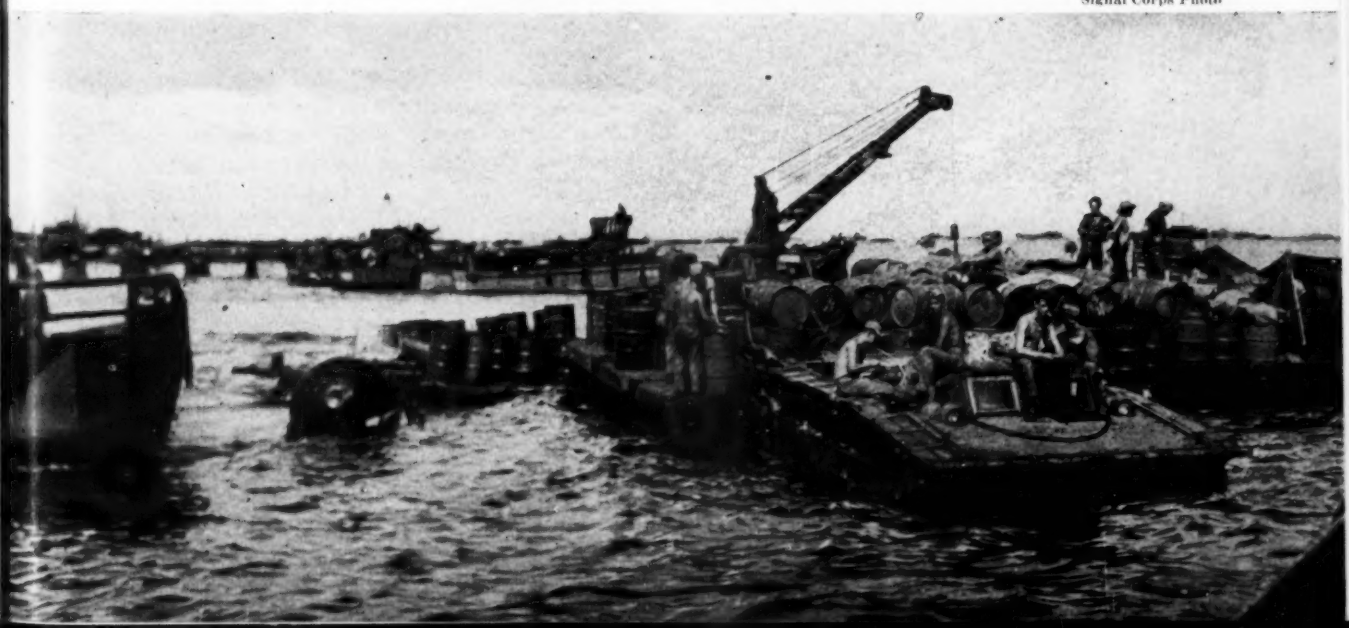
Practice Landings

Practice landings were carried out day and night as the provisional group rehearsed for the assault. The group carried the same infantry battalion it would in the actual operation. In the final training phase a series of landings were made with both single battalion and two battalions abreast. These landings were set up and carried out according to the D Day and D-plus-1 Day schedule. Firing was conducted in the final landing.

The first wave was to be made up of LVT A2s flanked by platoons of amphibian tanks echeloned to the right and left. If two assault battalions were used a

When coral reefs prohibited a closer approach at Guam, "alligators" were refueled 200 yards from the beach.

Signal Corps Photo



Signal Corps Photo

Amphibians move in on Morotai Island following its bombardment. Note smoke on shore from bursting shell.

wedge formation was to be employed. The force thus would obtain the fire power from all machine guns on the tractors as well as the 37mm and machine gun fire from the amphibian tanks. The tanks would also provide flank protection for the assault waves.

The provisional battalion issued all personal equipment and supplies for the initial assault landing. Division issued all other supplies. It was contemplated that the LVTs would return to the LSTs after each landing. Division therefore loaded emergency supplies on each LST so that tractors, tanks and crews could refit aboard the vessels. Four of the LSTs that carried tractors were stocked as floating supply dumps for assault troops who had gone ashore. On these LSTs two layers of ammunition were placed on the tank deck, and the tractors were carried on top of it.

Four of the 9 LSTs were to provide maintenance, and were equipped with second echelon tool sets plus all the spare parts obtainable. Personnel of the battalion maintenance platoon was divided among the 4 LSTs, each of which also carried two men from the attached ordnance department. In order to make available a motor park and a center for the rehabilitation of disabled vehicles the battalion also carried 21 replacement vehicles and crews on an LSD. Fifteen of these vehicles were LVT 2s and 6 were LVT A1s. The vehicles, crews, and the battalion rear command post were to be unloaded immediately.

Final Rehearsal

Preparations continued for the final rehearsal. The Navy furnished a schedule for arrival of the LSTs off the loading area. After all beaches had been sounded and reconnoitered for coral reefs, it was decided to load two LSTs at a time at beaches 5 miles apart. Five were loaded and then bad weather damaged two and delayed loading the last four. The battalion proceeded to the rehearsal area, leaving the executive officer to bring up the 4 stranded vessels, which arrived in time.

The rehearsal consisted of a number of landings that duplicated the formation and tactics contemplated for the pending operation. These landings covered a three-day period and brought out many unforeseen mistakes which were soon corrected.

On the last landing the LVTs remained ashore for an 8-hour period of maintenance. By 2400 all vehicles were reloaded on the LSTs and were en route to Pearl Harbor. The assault troops, who were on the transports, continued to another island for firing exercises which included familiarization with overhead fire.

Upon the arrival of the LSTs in Pearl Harbor on the 15th all troops debarked and went to their permanent camps for rehabilitation. A small detachment was left aboard to complete maintenance and resupply all vehicles.

En Route to Target

On January 19 the LSTs left for the target area. The transports followed on January 21.

En route to Kwajalein small details were ironed out. Numerous maps, aerial photographs and mosaics of the Kwajalein Atoll were available. Classes on orientation

were conducted. The ship's radio kept all personnel informed on the results of the naval and air strikes which were taking place the final few days before D Day. Following each strike new intelligence information and aerial photographs were distributed to all command elements for further study. After the final important briefing of staffs, we arrived off Kwajalein on the morning of January 31.

Kwajalein Atoll, the central and most westerly of the Marshall Islands, consists of a series of flat coral islands all connected by underwater reefs. At its furthest points it is approximately 70 miles long and 30 miles wide. The atoll consists of two main islands: Roi in the northern sector, on which was situated the only airstrip, and Kwajalein in the southern sector. Kwajalein Island, largest of the group, is approximately one and one-half miles long and 1,500 yards wide at its furthest points.

The task force consisted of three main groups: the northern landing force, the southern landing force, and a floating reserve. Three strikes were to be made simultaneously: one by the Marines in the north sector of Kwajalein Atoll, one by the army in the south sector, and the third by one battalion of an infantry regiment against Majuro Atoll, located approximately 300 miles southeast of Kwajalein. (The occupation of Majuro was made unopposed. In fact, there were only two Japs on the island, all dressed, packed, and ready to surrender.)

In the southern sector, a division reconnaissance company was to have landed in rubber boats on two small islands that guarded the passage into the lagoon. The company landed too far to the north, and missed one of the islands, but the mistake soon was corrected. The landing was opposed by about 30 enemy troops.

The capture of Carlson Island was considered the key to the operation because on it 5 battalions of artillery were to be set up to support the landings on Kwajalein Island. It was hoped Carlson would soon be secured so that the Kwajalein assault could go in on D-plus-1. Plans for taking the remaining islands in the atoll would be dependent on the tactical situation after Kwajalein's capture. The operation against Carlson, and also Carlos Island, called for simultaneous landings on each by an infantry battalion which would be carried ashore by one LVT Group.

Mechanics of an Assault Landing

The landing beach on Carlson Island had come under considerable prior attention. It had been accurately surveyed by submarines, aircraft and naval ships during the preliminary strikes, and azimuths had been taken to prominent objects ashore.

A reconnaissance of the beach had been made by a naval hydrographic party. During such work, usually carried out at low tide, and preferably at night, the area from the line of departure to the beach itself is cleared. All under-water obstacles, either natural or man-made, are removed or marked. Flags are used to mark boat lanes and all under-water objects which are not removed. Therefore, LVT personnel should be thoroughly acquainted with naval flag insignia.

In preparation for the strike against Carlson Island, the LSTs rendezvoused with the transports approximately 8 miles off Kwajalein Atoll. Here they took

"Alligators" are shown congesting the beach at Guam Island. Note edge of shell crater in near foreground.

Signal Corps Photo

aboard the troops who were to be carried ashore in their LVTs. At the same time, the control party was transferred to the senior control vessel, which then went to its position on the line of departure off the landing beach. By radar, the control ship placed itself in its exact position on the line of departure, which was 2,000 yards off shore, and the senior control boat took position on the left flank of this line. As a marker for the boat lane, which was approximately 600 yards wide, a sub-control craft (LCC) took its place on the right flank of the line of departure.

When the troops had been transferred to their proper LSTs, the vessels proceeded to their rendezvous area, which was about 1,000 yards in rear of the line of departure. Here the naval wave guide-officers met the waves carried by the LSTs and guided them to their assigned rendezvous area in rear of the line of departure. Each wave guide-boat flew a wave numeral flag, so that waves could be identified by the control personnel aboard the senior control craft.

The control party, carried by the senior control craft, usually consists of the senior naval control officer, responsible for the dispatching of the waves and all future traffic in and out of the beach; the assault troop commander, or his representative, who is vitally interested in the mechanics of the landing, which involves both his troops and their supplies; the unit supply officer, or his representative, who is responsible for the supplying of all assault troops ashore; and the LVT commander, or his representative, in command of the LVTs that are carrying the troops ashore. Here is a team that controls all phases of a landing operation, which are placed together to facilitate decisions on all landing problems. Each of these persons, as a rule, supplies his own communication equipment, but equipment aboard the control boat is available as a supplement.

From the line of departure, to which the waves had been guided, the LVTs were to be launched at a specific time. As H Hour approached the senior control officer raises the Number 1 Flag. This readies the first wave for departure. At the proper time, the 1 Flag is executed, or lowered, and the first wave moves across the line of departure. It is flanked on one side by its naval wave guide-boat, and on the other by the sub-control craft, which will guide the wave to the beach and go in close to the shore in order to obtain information on reef and general hydrographic conditions. The sub-control craft then returns to the flank of the boat lane, and out of range of small arms fire, where it sets up a rendezvous area for the tractors after they have unloaded ashore. This rendezvous area is used for the transhipment of troops from LCVPs to LVTs in the event the LCVPs are unable to land troop loads directly onto the beach. As subsequent assault waves are dispatched, they are guided in to the beach by their wave guide-boats, unload their troops or supplies, and then return to the rendezvous area. After completing their work, the naval wave guide crafts report back to the control boat and either are sent back to their mother ship or kept as tenders with the control boat.

Landing Goes In

In the landing on Carlson Island the first wave consisted of 8 LVT A2s flanked by two platoons of amphibian tanks. Its mission was to hit the beach, unload, and then move inland approximately 100 yards where it was to set up a perimeter defense for the protection of the landing of the assault troops. The subsequent waves of amphibian tractors were to land, unload their troops and return to the rendezvous area. When the troops had reorganized and tanks had been landed, the amphibian tractors and tanks were to be relieved and returned to the water.

As the action actually occurred, the lack of enemy resistance permitted the first wave to move rapidly inland to the appointed position. Here it waited until the infantry arrived and took over. It then pushed forward across the island to take one-third of it before finally setting up its defensive line. It then was relieved by land tanks and returned to the beach area. The landing on Carlos Island was carried out in the same manner, except that there were no amphibian tanks attached to that assault battalion.

In the landing on D Day, two LVT groups were used. Without vehicular casualties, they had carried the assault troops ashore, returned to the rendezvous area and transported other battalions in and had been reloaded on LSTs by 6 o'clock.

At 4 o'clock on the afternoon of D Day, 4 LVTs carried a naval hydrographic party on a reconnaissance of the proposed assault beaches off Kwajalein Island. These vehicles met light small-arms fire but returned without casualties.

By 6 o'clock that evening both Carlson and Carlos Islands had been completely secured, and the artillery had been set up and registered on Kwajalein Island. Approximately 120 enemy had been encountered.

On the afternoon of D Day, all replacement vehicles, crews, the ordnance detachment, and the executive officer with the rear CP were sent ashore on Carlos Island to establish a motor park.

The Kwajalein Landing

The following morning the Kwajalein assault took place. The assault troops consisted of two infantry regiments which landed abreast, each regiment in column of battalions. Four assault battalions were loaded in the 4 LVT groups. The first wave was furnished support by the tank company with a platoon echeloned on each flank, and a platoon, with company headquarters, in wedge formation between the two assault battalions. The landing was made on schedule under heavy small arms fire.

By 12 o'clock the tank company had been released and loaded. The tractor groups, having to tranship and carry ashore the reserve battalions, were not released till

after dark. It was impossible for the LVTs to distinguish their proper LSTs, which caused many to be temporarily lost. A complete accounting was not obtained until the following morning. The remainder of this day was used for rehabilitation of men and vehicles. By 12 o'clock all LVTs had either been landed on Carlos Island or were loaded on LSTs just off shore. Vehicles needing major repairs were sent ashore on Carlos Island and replacements were sent out to the LSTs.

The assault on Burton Island was made on February 3 by two assault battalions of infantry which were transported by two LVT groups. During the action, a tank platoon captured two small adjoining islands. The following day one LVT group was divided and each half carried assault troops ashore on either Blenkenship or Burnett Islands. On February 5, three LVT groups each carried a battalion of infantry ashore on Berlin, Beverly or Bennett Islands. On the same day a fourth LVT group and two platoons of amphibian tanks were loaded on two LSTs carrying 11 tractors, 6 tanks and two companies of assault infantry. The mission of these two task forces was to proceed up each side of the lagoon and to land on and occupy the remaining islands in the southern sector of the atoll.

By Febtuary 6 all islands had been completely secured. The estimated enemy dead was 4,500. During the action, the provisional tractor battalion's losses were one man killed, and about 25 wounded and no permanent vehicular casualties.

A practice by which groups were kept at full strength and were always prepared for the next day's assault was to move all LSTs to the vicinity of Carlos Island at the end of each day's operations. At this point vehicles and personnel could be completely resupplied, and any vehicles needing major repairs could be sent ashore and replaced with replacement vehicles complete with new crews.

Upon completion of the operation, all vehicles were moved to Carlos Island, unloaded, and rehabilitated as well as possible with what material was at hand.

The Eniwetok Operation

At the conclusion of the Kwajalein operation our amphibian tank battalion (less one provisional LVT group, and all replacement vehicles and crews) was attached to a tactical group for the operation against Eniwetok, 300 miles to the northwest. All LVTs were assembled ashore and the vehicles in the best condition were selected. All others and their crews were to return to the Hawaiian Area.

The tactical group was a Marine headquarters provisionally set up to command the ground forces in the Eniwetok attack. The amphibian tractor battalion was to carry in assault troops in all scheduled landings.

As described in the preceding article, this battalion was a provisional one made up and trained for a specific mission, and using prescribed formations. The assault battalions of this task force had likewise been specifically trained, but used their own prescribed formations. These were put together, and based upon naval assault boat tactics. Personnel had little or no training with LVTs. It was finally decided to adopt new formations, and to carry out the assault missions as prescribed by the infantry assault battalions.

Preparations

This necessitated a reorganization of the battalion. The three provisional companies were reorganized into two, so that each company had a total of 51 LVTs, 28 LVT A2s and 23 LVT 2s. The tank company, which remained unchanged, was composed of 17 tanks. The battalion headquarters set-up was not changed.

The communication plan for this operation was about the same as for Kwajalein. A rear command post was set up on the command LST from which the executive officer could communicate with me as well as the LSTs, since each one was equipped with a 510 radio. These radios were to be used for communication while the battalion was loaded. My 510 was replaced with a 610 and one channel set up on the LST common channel.

The Kwajalein supply plan was followed, and an emergency load of rations, fuel, water, ammunition, etc. was placed on each LST so that it would provide a floating base. Supplies could be replenished from the dumps on Carlos Island.

The Kwajalein operation had ended February 6, and on the same day reassignment had been made to the tactical group for the Eniwetok assault. By February 9 all preparations had been completed—including rehabilitation, reorganization, and supply replenishment—and the battalion had been loaded. On February 11 the LSTs left Kwajalein, and on the 13th the transports sailed. D Day for Eniwetok was February 17, H Hour at 0830.

During the interim, the company commanders had talked to all personnel of the battalion and explained to them the capabilities and limitations of LVTs, the formations to be employed, and the tactical use of these vehicles. Complete sets of orders, maps and aerial photographs had been furnished each commander down to and including platoon leaders. The battalion had been briefed on the general situation as well as their own specific part in the operation.

The operation against Eniwetok had originally been scheduled for May, but an attack at this time appeared opportune for a number of reasons. The Kwajalein operation had progressed very smoothly and had not necessitated the commitment of the floating reserves. The naval reconnaissance had reported increased activity both from the airfield and on the atoll's defenses.

Enemy reinforcements also were reported being sent from the Marianas to strengthen the defense of their remaining atolls in the Marshalls. If Eniwetok was captured now while all was in readiness, preparations would not have to be made over again later. It also would be a greater surprise to the enemy, and, if it could be captured before reinforcements arrived, the job would be less costly in manpower.

Eniwetok Atoll is the westernmost atoll in the Marshall Group. It is oblong, approximately 35 miles long and 20 miles wide at its furthest points. There are three main islands, Anigebe, Eniwetok, and Perry, none of which are much more than a mile long and 1,000 yards wide. Intelligence reported approximately 3,000 enemy troops in the atoll.

Just after daylight the task force entered the two known passages on the lagoon side of the atoll. The LSTs, preceded by mine sweepers and escorted by destroyers and cruisers, entered the western passage and moved up the lagoon to a transport area about 5 miles off Anigebe Island. At approximately the same time, the transports, preceded by mine sweepers and escorted by destroyers, cruisers and battleships, entered the southern passage and continued to the transport area.

The plan of attack had been drawn up as follows: at H Hour on D Day an amphibian corps reconnaissance company was to land in LVTs on the small islands flanking Anigebe Island, on which artillery was to be emplaced to support the main landing. The capture of these islands also would keep the Japanese from infiltrating to the flanks and making counter-landings during the assault on Anigebe. No resistance was met, and by 1800 on February 17 the artillery was in position and registered on Anigebe Island about one and one-half miles away. On D-plus-one, two battalions of Marines were to land abreast on Anigebe with the mission of securing the airfield immediately, and the island as soon as possible.

On D-plus-X (it was hoped that X would be 2), the two battalions of an infantry regiment were to land simultaneously on Eniwetok Island and Perry Island. One battalion of Marines was to be alerted as a reserve for these two landings. This was as far as specific plans had been made, and the capture of the rest of the atoll was to be carried out as the tactical situation permitted.

Excellent air photographs of Eniwetok and Perry Islands showed that all ground installations had been destroyed. Since there was no visible sign of occupation, it was believed that possibly the two islands had been evacuated or were held by a relatively small enemy force. This proved to be incorrect. *(If properly used, nothing surpasses air photographs for orientation and interpretation of ground installations, but they should not be used as the last absolute evidence in planning a tactical assault. They show all exterior installations, but underground installations seldom can be seen.)*

On the atolls prior to Eniwetok, American troops had encountered enemy garrison forces consisting of naval personnel, falsely called Imperial Marines. Nowhere in Japanese T/Os have Imperial Marines been indicated as an organization. It is believed that such naval personnel were mainly base construction troops, and stranded sailors whose ships had been sunk. At Eniwetok an entirely new enemy was met—the army. It was the first time in the Central Pacific area that Japanese army troops had been encountered, and they fought with organized defenses and withdrawals, rather than with Banzai attacks that pitted swords and hand grenades against tanks.

The reconnaissance company landed unopposed on the islands adjoining Anigebe, and by dark on D Day the artillery had been landed and was registered in. All during that night naval gun fire pounded the defenders of Anigebe Island. At dawn on D-plus-one the reinforced marine regiment was ready for the assault.

Anigebe Island is 1,500 yards long and is shaped like a triangle. The Japanese found the island not quite long enough for an airstrip that would accommodate the larger types of planes, and to remedy this they had added a cement extension to the airstrip which they had built on the north edge of the island. This cement abutment extended out 100 yards into the lagoon, its top about 8 feet above the water. Along its sides pillboxes had been constructed to provide perfect fields of fire into the lagoon. The landings was to go in on this side of the island on a strip of beach 1,000 yards long, in the center of which was a pier.

The morning of D-plus-one was overcast, a strong wind was blowing and the current was moving at about 4 knots across our front. The control boats, whose duty it was to form the line, had been late in arriving, and when the LSTs came into position to launch the LVTs the line of departure had not yet been established. Consequently, by the time all LVTs had been launched they had drifted about 500 yards to the flank of the line of departure. Steps were taken immediately to move the LVTs to their correct position, and soon the first wave, followed by its successors, were en route towards the beach, flanked by their naval guide boats.

The Assault Landing

For some time prior to the dispatch of the assault waves, destroyers, cruisers and battleships were busy pounding the beach area with everything from 20mm to 16-inch guns. The supporting artillery—a battalion of 105mm howitzers and one battalion of 75mm pack howitzers—also was laying down its barrage. Naval aircraft took part, hitting the beach area with 100 and 500 pound bombs and rockets.

Upon crossing the line of departure, the first wave was preceded by LCIs. These craft fired into the beach with 20- and 40mm rapid fire weapons and, when 1,000 yards off shore, launched their vast number of rockets, which swished in and exploded with devastating effect. The LCIs led the first wave toward the beach until forced to pull off to the flanks, from which

point they continued to support the landing. Their move cleared the front ahead of the first wave which, when 500 yards from the shore, opened up with its large number of 37mm, .50 and .30 caliber machine guns. The succeeding waves fired when ordered by an officer, and then at only point targets.

The first wave continued to fire through the blanket of dust and dirt which covered the beach area. On the morning of February 17 this cloud of dust so obscured the island that it prevented the naval guide-officers from seeing their land marks ashore. This, coupled with the wind current, caused them to land about 300 yards north of their scheduled beaches. The result was that the assault battalion on the left flank landed at the end of the cement abutment from whose pillboxes a withering fire was sent into the troops as they climbed up on top of the flat airfield. The LVTs soon closed under the abutment, and reached a dead space out of the field of fire. It then was comparatively easy to neutralize the fortifications by hand grenades lobbed up into the pillboxes.

The amphibian tank platoon, coming in echeloned for a landing on the left flank, was forced to go in on the northern point of the island. It was a hot spot, but the platoon in a short time, and without supporting infantry, had neutralized and partially cleaned it out.

As at Kwajalein, the mission of the first wave of amtanks and amtracs was to push inland approximately 100 yards, unload their infantry, and with them set up a perimeter defense which would protect the landing of the remaining waves. After the land tanks came ashore and the infantry had reorganized preparatory to continuing the attack, the tractors composing the first wave were to return to the water rendezvous. The two flank amtank platoons, each supported by a company of the reserve battalion, were to pull off the flanks and protect them against enemy counterattacks. The center amtank platoon was to rendezvous on the beach, and the company commander was to report to the regimental CP ashore.

After landing, the mission of the two assault battalions was to push across the island as quickly as possible. The reserve battalion was to land when enough LVTs returned to the water rendezvous area to carry them ashore. The battalion, less two companies which were protecting the flanks, was to remain on the beach until called by the regimental commander when the tactical situation warranted.

The relationship of the infantrymen to the tractor crew is of utmost importance; for the infantryman, as well as everyone else, is experiencing fright while moving in on the assault. He is not only afraid of what he will find ashore, but even more afraid of the tractor in which he is riding. The tractor crews also are fearful of the work ahead but since they will unload the troops ashore and immediately return to their water rendezvous they have only half as much to fear. A tractor commander and crew, therefore, can do much to alleviate the infantryman's fears by making him realize that nothing outside of a direct hit can harm the vehicle.

Anigebe Island was secured by the Marines in 6 hours and 40 minutes. By 1700 the LSTs had re-loaded their LVTs, and were assembled in the transport area receiving the infantry regiment that was to take part in the next day's assault.

A complete enemy plan for the defense of Eniwetok Atoll had been captured on Anigebe Island. It showed that Eniwetok and Perry Islands were strong points in the defense of the atoll and were occupied by from 1,000 to 1,500 troops. It was decided, therefore, to send against it two infantry battalions in column of battalions, and to alert a Marine battalion as a reserve. The assault on Perry Island was postponed until after the capture of Eniwetok.

Little attention had been given Eniwetok because air photographs had shown its installations destroyed. An hour before the assault an intense naval and air attack was made. This failed to destroy the trees and vegetation, which provided cover from which the enemy sent heavy small arms fire against the assault troops. In contradiction to the air photographs, a cliff from 6 to 10 feet high was found about 10 yards from the water's edge. Tractors and tanks were held up until reconnaissance parties located openings through which the vehicles advanced across the island proper to carry out their normal mission. Intense opposition was encountered, however, and two days were required to secure the island.

On February 21, after a day for rehabilitation and reorganization, the assault was made on Perry Island, the last enemy stronghold in the atoll. It was captured the following day.

Of the estimated 4,500 Japanese on Eniwetok Atoll, all were killed but the few that surrendered. The battalion's only vehicular casualty in either the Kwajalein or Eniwetok operations occurred at Perry Island, when a tractor which had just transported casualties to a transport, was hit with shrapnel. Its engine cut out and it sank.

On February 23 the battalion was released from the tactical group and ordered to load on LSTs for the return trip to the Hawaiian Area.

The Marianas Operation

Approximately a month after our return to the Hawaiian Area from the Kwajalein and Eniwetok operations, a three-month training schedule was begun with the firing of individual and vehicular arms. The schedule next called for platoon and company training on land and water, and was to end with a series of bat-

talion exercises and combat firing. Mistakes noted in combat were to be emphasized.

The camp provided limited facilities and it was necessary to construct many of our own ranges. A minimum of time was to be spent firing at known distances—a maximum amount on combat courses.

Combat had shown the need for a vehicular combat course, especially for training the scarf gunners. A crude but effective course was constructed: a trench was dug about 25 yards long and 12 feet deep. Prone, standing, and kneeling silhouette targets were nailed to long poles, and volunteers carried them back and forth in the ditch, which caused them to bob and change position rapidly. Firing first was from stationary vehicles at ranges of 50 and 100 yards; the vehicles then moved slowly from the 100 yard to the 50 yard point, firing as they approached. The scarf gunners also fired a few rounds at stationary targets, and strange to say, got fewer hits on them than on the bobbing targets.

On the return from the combat zone all tractors were turned in to ordnance for rebuilding. In order to further familiarize crews with their vehicles 30 amphibian tanks were retained. Among other training, the crews—helped by maintenance personnel—tore down these amphibian tanks. Then, starting with a hull, they completely rebuilt them, cleaned them up, worked over the parts and substituted new ones where necessary. Parts that had failed during combat were given a particular scrutiny and many corrective experiments were tried. The men preferred these vehicles for the next combat to the new ones which were received for it.

On April 20, 1944, the battalion was assigned to an amphibian corps for operational control, and attached to a Marine division. Assigned to the division for the coming operation were three amphibian tractor and one amphibian tank battalions. Our battalion was to constitute the first assault wave and land in a line formation with 4 companies abreast. Each company was to have 18 amphibian tanks, making a total of 72 in the battalion. Each of three LSTs was to carry an assault company, and the fourth the battalion headquarters company. The tractors which were to transport the troops ashore were to be carried on the LSTs and one amphibian tank platoon was to be carried with each assault company. The two company headquarters tanks, and a battalion tractor were to go on the assault battalion's headquarters LST. Four LSTs, therefore, were to transport a complete assault battalion and all of its attachments of tractors and tanks.

We were ordered to load for combat, and finally were assigned the top deck of an LST for organizational equipment, which included 5 2½-ton trucks and trailers, 4 ¼-ton radio trucks, kitchen equipment, a 20-day supply of expendable items, and other impediments. All of this equipment was water-proofed, packed and loaded on time, but not without difficulty. As in the Eniwetok operation, an emergency supply of fuel, oil, rations, ammunition, etc., was loaded on each LST in the event it was necessary to use these craft as floating bases. We drew from the Marines 40 new LVT A1s which had to be processed and re-supplied with missing items.

The training program was accelerated, and vehicle training coördinated with vehicle availability. After all vehicles had been completely equipped and worked over, and before they were finally loaded, all companies conducted trial water runs of 12 miles, culminated by platoon and company firing problems on both land and water. During the runs, all phases, such as communication, control, etc., were tested. A three-day period of maintenance and equipment rehabilitation was conducted just prior to loading for the rehearsal. Our only training with the Marine division consisted of a CPX based upon the plans for the coming operation.

Five days before the final loading for the rehearsal, the battalion was issued 16 LVT A4s equipped with 75mm howitzers. Since this had been anticipated, classes within the companies had already been conducted by instructors from assault gun platoon of the old medium tank battalion. These LVT A4s were not equipped with machine guns, and in order to have tank assault gun teams it was necessary to assign them within the companies. Each company got 4 of the craft and distributed one to each platoon and one to company headquarters. The platoon leader used his as a command vehicle, as he was in a position to support either section of his platoon. The LVT A1s had an additional mission of protecting the assault gun and its scarf machine guns. Prior to loading they made a trial run and each crew fired 75 rounds from land and water.

With few exceptions the organic communication set-up for an amphibian tank battalion was used. Each command tank was equipped with an SCR-508, other tanks had SCR-528s. The battalion was assigned 5 FM channels for battalion command and company channels. We were required to guard an LVT common channel, which was the common channel of the provisional LVT group headquarters and under which came amphibian tank and tractor units. Each tank company sent a liaison officer with a 510 radio and an operator to the assault infantry battalion. This liaison officer was to accompany the assault battalion commander during the assault. The battalion also furnished each regiment a liaison officer with an operator and a SCR-510 radio. This officer was to accompany the regimental commander in the assault. A 510 radio was also on the division command ship. At all times the tank company was in contact with its assault battalion, and I was in contact with the regiments as well as the assault battalions through regimental liaison officers. Complete water-proofing of all radio and inter-communication equipment was accomplished after much experimentation. Communication proved excellent during all phases of the operation.

The rehearsal, lasting 6 days, consisted of a series of assault landings in which the exact formations and tactical plans to be used in the pending operations were employed. After completing its rehabilitation, the unit

was ready to embark, and re-loaded during rough weather.

. On May 19, we arrived at our base, where we spent 5 days rehabilitating vehicles and supplying the articles found missing during the rehearsal.

The task force arrived at its forward base on Eniwetok, on June 8. Final orders were issued and last minute supplies taken on, and on June 12 we left for the target area.

The Marianas are a series of islands lying about 1,200 miles southeast of Japan. The main islands are Guam, Saipan, Tinian, Pagan and Rota. Unlike the previously assaulted coral atolls these islands are volcanic in structure. The Japanese headquarters for the Central and South Pacific Area was located at Garapan, the capital, which is on Saipan. Intelligence reported approximately 60,000 enemy troops in the Marianas, 30,000 on Saipan, 10,000 on Tinian, and 20,000 on Guam.

The natives are nine-tenths Japanese civilians and one-tenth Charmaros. Since these islands had been under Spanish control until 1899, the Charmaros were a mixture of Spanish and Polynesian. Ruled by Germany until the end of World War I, the islands were then given to Japan, and at this time were being used as a staging area for the Central Pacific.

The Assault Plan

The first phase of the assault was to be an attack on Saipan by a "Northern Landing Force," and the second phase on D-plus-three was to be made against Guam by a "Southern Landing Force." On approximately D-plus-20 the assault on Tinian was to be made.

Two divisions abreast were to land on the southwest of Saipan. They would go in with two regiments in line, each regiment having two assault battalions. The landing, therefore, would be made over a 4,000 yard front with 8 battalions abreast.

The Marines, on the south flank, were to land on 4 beaches, each approximately 500 yards long. The plan was for the first wave of amphibian tanks, and the second and third waves of tractors which carried assault troops, to hit the beach and move inland, by-passing all organized resistance. They were to proceed inland for approximately 2,000 yards to the "0-1" line, which extended along the first high ground on that side of the island. Here the infantry, carried in by the first two tractor waves, was to unload, and with the support of the amphibian tank battalion, was to set up a perimeter defense to protect the landing of the remainder of the troops. The following tractor waves were to unload their infantry on the beach. It then would push forward to the 0-1 line as quickly as possible, cleaning out all enemy resistance within the beachhead perimeter. All tractors were to return to the water rendezvous after they had unloaded their troops. The amphibian tanks were to remain in support of the infantry until relieved by the land tanks.

For the continuation of the attack beyond the 0-1 line, three possible plans were devised as follows:

Plan 1—If the initial beachhead line was taken *early* in the day and *with a minimum of personnel and vehicular casualties*, the Marines on the left flank of the assault were to be loaded in 150 LVTs and, protected by medium and amphibian tanks, were to launch a mechanized attack on Aslito airfield. The Marines on the right would support the attack by pushing forward. Other Marines would be landed to take over the left flank area and would push forward to protect the mechanized attack from an enemy counterattack from the high ground on the north.

Plan 2—To be used if the assault troops occupied the 0-1 line *early* in the day, but had *sustained medium personnel and vehicular casualties*. It called for the landing of additional Marines on the left flank, loading them in 150 LVTs and launching a mechanized attack as described in Plan I.

Plan 3—To be used if the assault troops arrived at the 0-1 line *late* in the day *with medium personnel and vehicular casualties*. This plan called for launching on the following morning over the entire front an attack supported by medium and amphibian tanks.

The Landing

D Day, June 25, was perfect for an assault. From the division command ship, I was unable to contact my battalion by radio because of distance and interference, and shifted to the air observers net in order to follow the course of the assault. On it I followed the progress of the tanks and tractors until I went ashore at 1230 to establish contact with my companies.

Company B, which supported the 1st Battalion of one regiment, was to land on the beach, then proceed through the town of Charan Kanoa to the 0-1 line about 2,000 yards inland. As the action occurred, the men approached the beach under medium small arms and artillery fire and mounted the reef about 800 yards from shore. While crossing it two vehicles were lost, and on moving inland toward the town, two more vehicles were temporarily lost when they hung on stumps or bogged in shell holes. Company B had planned to pass through the town in line of platoon columns, reform their company in line formation, and proceed over the open ground just beyond the town to the 0-1 line. Although a small lake was known to be in the area there seemed to be a sufficient amount of hard ground to permit passage. This assumption proved incorrect. The majority of the ground beyond the town was in rice paddys which an amphibian tank could not negotiate. Plans were therefore changed. The company crossed the open ground without receiving heavy weapons fire, and proceeded in a canalized fashion along the one road leading from the town to the 0-1 line, which it reached at 1000 hours with 13 tanks. It was then ordered by the assault battalion commander to wait for infantry support. At about 1800, Company B was released to return to the beach for refueling and resupply.

Company A, in support of the 1st Battalion of a Marine regiment, was to land and proceed in line to the 0-1 line. It approached the beach under heavy small arms and mortar fire, lost some vehicles in crossing the reef, and landed. About 800 yards inland it was stopped by the rice paddys. Unable to find a way around, it tried infiltrating through, but after three or 4 vehicles bogged down, encircled the right flank of the swamp. Only 8 of its tanks reached the 0-1 line on D Day. The others were either on the reef, hung on stumps or in ditches, or had been destroyed by fire while advancing. At 1800, the company was released for refueling and resupply. At the end of D-plus-two, it had 5 tanks operating and had suffered about 50 per cent casualties, including all company officers.

The mission of Company D, supporting the 1st Battalion of another Marine regiment also was to reach the 0-1 line at a point, 1,500 yards inland. It too met heavy small arms and mortar fire while going in. Three vehicles were lost as it proceeded inland, and on crossing the open ground it came under heavy artillery fire and lost two tanks before the enemy guns could be knocked out. The company arrived at the 0-1 line at 1000 with 12 tanks, and remained there until 1800 when, less one platoon, it was released for refueling and resupply. The platoon remained on the line overnight in support of the infantry.

Company C was in support of the 2d Battalion of the same Marines. Its right flank platoon, aided by a company of infantry, was to move forward and clean out enemy installations on Aganin Point. It had partially accomplished the mission when ordered to withdraw because the area was to be covered by our own air and naval gun fire to discourage a probable enemy counterattack. The platoon remained near the beach and helped infantry personnel clean out enemy pillboxes. Seven of Company C's tanks arrived at the 0-1 line at 1000, and remained overnight supporting the infantry and returned to the beach the following morning to refuel and resupply.

By 1000 on D Day the battalion had put 40 tanks on the initial beachhead line. They were placed in defiladed positions from which they could support the infantry. Although very few casualties were suffered on the 0-1 line—since most enemy fire was directed at the immediate beach area—by the end of D Day the battalion had approximately 28 tanks operating and had had about 100 casualties. During the afternoon, additional Marines came ashore and went into a front line sector. That evening the enemy launched an armor-supported counterattack and penetrated to the beach, but the next day were driven back.

On D-plus-one Company B was attached to a regiment of Marines, and the remaining companies, with all serviceable tanks, returned to the front lines and supported infantry attacks. Until D-plus-11 the amphibian tanks continued to support the infantry, either operating with the land tanks, or supporting them by fire, or leading the attacks when land tanks were not available. During this time it was necessary to reorganize the battalion into three provisional companies in order to rest the men and rehabilitate the vehicles. Two of the companies were kept on the line and one in the battalion bivouac.

On D-plus-two, the battalion rear echelon came ashore and a bivouac area was established where all disabled vehicles were assembled for repair or salvage of usable parts. On D-plus-three, the companies were placed under battalion control and daily two of them were attached to the two assault regiments. On D-plus-9, the bivouac area was moved from the beach to a wooded area on the 0-1 line, a mile in from the beach.

The Final Phase

During the final phase in Saipan's capture, amphibian tanks were used from the water to aid the infantry in cleaning out caves along the shoreline, and also to encourage the civilians that were in the area into surrendering.

On D-plus-12 the battalion was released from further combat, alerted for the assault on Tinian, and instructed to rehabilitate as many vehicles as possible.

The assault on Tinian was to be made on two narrow beaches approximately 65 yards wide and 1,000 yards apart. Amphibian tanks were not to land in the first wave because the beach areas were known to be covered with mines. They did, however, lead the assault waves to within 300 yards of the shore, then pulled to the flanks and supported by fire the landing of the infantry from tractors.

The two available companies of my battalion were not used in this landing, but were loaded on LSTs that were lying off Tinian awaiting orders to land if needed. On July 25, Y-plus-one, one company was called ashore to support the medium tanks in an attack. The following day the remainder of the battalion went ashore, and until July 28 was used in the front lines to support and protect the land tanks in their attacks. On July 29 the battalion was released, and loaded on LSTs for the return to the Hawaiian area.

During this operation, the battalion sustained about 31 per cent personnel casualties. Sixteen tanks were completely demolished; 14 were partially demolished or mechanically disabled and shipped via LST to Pearl Harbor. The battalion loaded 38 amphibian tanks and 4 amphibian tractors for the return trip.

Should We Violate Principles of War?

by Brigadier General Hamilton S. Hawkins, Retired

AFTER every war we are too prone to regard the manner in which it was fought as a standard by which we are to fight the next one. With some exceptions, of course, our schools teach military students the tactical methods by which our victories were won. Too little consideration is given mistakes made, or standard methods which even though they were successfully applied, were not good, or at least could have been improved upon.

I

At the beginning of World War II, it was easy to predict that the Germans were going to use armored forces to the very limit. If needed, the campaign in Poland was a preview of the methods that we should have expected the Germans to use. Taking advantage of the weaknesses that they knew existed in the French and British armies, the Germans justifiably decided to make a speedy and rapid war of movement, in which they relied chiefly on their armored forces. They knew that the short Maginot Line could be by-passed, at least temporarily; that the Allied armies were not equipped with sufficient or large enough caliber antitank guns. They knew that they had superiority in the air; and that the trend in the Allied armies was to give more importance to strategic bombing by the air forces than to the tactical use in support of ground armies. They also knew that the cavalry regiments in the armies of their opponents were being mechanized, and that even if horse cavalry were retained it was not properly equipped or trained for modern warfare.

All of this led, naturally, to the German expectation of a quick victory over France, and over any other European states that might oppose them. From here on, the Germans were unimaginative. They believed that the occupation of France, Belgium, Holland, and Norway would put them in a position to defeat England by submarines and by air, and perhaps even by invasion. After the defeat of England they thought it would be easy to take care of Russia; that the use of mechanized troops would render it unnecessary to use cavalry, and that the Russian army was ill supplied and equipped, and, if necessary, could be beaten almost as quickly as that of France.

Certainly after the Polish campaign the military authorities in France, England and the United States could, and should, have foreseen what was coming. It was obvious that the German mechanized forces were going to move and fight on or near roads. It should have been obvious, therefore, that the only way to stop them was by antitank guns in great numbers, tactical air forces, and properly equipped and trained cavalry able to maneuver boldly across country. It should have been apparent that infantry, heavily supported by artillery, would remain the basic arm for both defense and attack. It should have been realized, however, that without the elements just mentioned—antitank units, tactical air force and cavalry—the infantry would be unable to stop the rush of German armor.

The Allies did not have armored forces to compare in quantity or quality with those of the Germans. What armored troops they had were used improperly. The tactics of armored troops had not been developed and, in my opinion, were not truly understood even by the American army in North Africa, Italy, and Europe during the latter years of the war.

It was thought that the absence of armored troops in the French and British armies was the reason for the German success in 1940; but this was only partially true. The elements already mentioned could have made a successful defense without armored forces. The great advantage of a large armored force, as developed later in the war, was for defensive operations after our infantry had made it possible for the armored forces to break through.

It is not hindsight at all that prompts these observations. They were manifest at the time, and were often stated. After America entered the war there were many tactical errors made that should have been avoided. Although there were many brilliant actions fought, our tactical leaders should have been, and could have been, better trained if our War Department staff and school authorities had listened to several voices that were crying in the wilderness before and during the war. It is not intended to accuse all of our tactical leaders of these errors, but there were too many of them who were guilty. Here are a few of these errors:

II

Infantry regiments were deployed for battle in a uniform, continuous line of skirmishes across all sorts of country, whether cover existed for some of the smaller units or not. Troops should not have been required to advance over long open spaces without cover. Rather

than this, the various columns should have assumed narrow fronts and greater depth so as to advance only over country that was rough, broken, or wooded enough to afford the deployed soldiers a chance to use cover skillfully, and to reach the enemy without being killed or wounded. Open spaces should have been strictly avoided. Although some casualties are inevitable, every soldier has a right to feel, after experience in several battles, that he has a fairly good chance of getting to the enemy and destroying him without being wounded or killed. The realization could have been acquired only if skillful tactical methods had been used by the leaders of both large and small units. In many cases, tactical leadership was excellent; but too often it was poor. Poor tactical leadership can be charged only to insufficient or incorrect training during the preparatory period in this country. The individual training of soldiers in the use of arms and on obstacle courses, however thorough, cannot make up for poor or inadequate training of tactical leaders.

Too often higher commanders did not allow the necessary time for commanders of combat units or groups to look over the ground on which they were about to commit their troops. This impatience came from ignorance, or from similar pressure from still higher commanders. Of course, such pressure often is necessary to overcome the lack of initiative or over-cautiousness of some subordinate commander. But too frequently it comes from sheer ignorance of what the smaller unit commander has to do to skillfully conduct the advance without too many casualties.

Troops that have been treated in this way will stand for heavy losses a certain number of times, but, eventually, they lose their morale through lack of confidence in their leaders, and because of their certainty that they have little or no chance of getting through a battle without being killed. When this occurs, it takes new leaders, and skillful and considerate handling, to restore morale.

III

Another tactical mistake, especially noticeable in the larger units, is overdispersion. For fear that the enemy may take advantage of some ground that is not occupied by our troops, either in attack or defense, some commanders of large units have spread their forces over entirely too long a front. The desirability of covering the whole critical front may be obvious, but if there are not a sufficient number of troops available to do it properly it is a serious error to attempt it. No command should be spread out to such an extent that its several parallel columns are beyond supporting distance from each other. Furthermore, provision must be made for the establishment of a suitable reserve.

Each column must have some depth, and, in addition, a general reserve must be established. If this cannot be done, the front must be narrowed until it can be, even if some of the front for which the commander is responsible is left without any troops. The front assigned may be larger than the unit can take care of as its commander might wish. The only solution is to dispose the unit into several columns or groups within supporting distance of each other, keep back a reserve, scout the vacant parts of the front with small mobile elements, and trust that any enemy forces that may venture into this vacant area may be attacked in flank.

If it is a question of defense, a command too small to cover the entire front properly must resort to delaying actions conducted to prevent any enemy of superior strength from enveloping its flanks and surrounding the command. It is certainly better to fall back, with the command in hand and fighting delaying actions, than to make a stand so prolonged that the command may be surrounded and destroyed.

The most flagrant violations of these principles during the recent war were the overextension of the II Army Corps southeast of Tunis, North Africa, in 1943; and the overextension of certain large units of the U. S. First Army in the Ardennes region of Luxembourg and Belgium, which resulted in the Battle of the Bulge.

The defeat and near disaster to our II Army Corps in North Africa apparently was due to two things: the lack of clear-cut mission, and the dispersion of the corps over a front of approximately 70 miles by direction of the British high command in that area.

General Rommel's army was halted facing General Montgomery's 8th British Army at the Mareth Line. Our II Corps was ordered to move toward the Mediterranean seacoast with the object, as far as we know, of cutting or harassing Rommel's line of retreat toward Tunis. In the first place, this was a very dangerous mission for one corps, unless it was merely to harass Rommel's line of communications and fall back in case the Germans attacked in force. There should have been no misunderstanding as to exactly what the corps was to do. In the second place, the several columns of the corps should have been kept within supporting distance of each other instead of spreading over such a wide front. No reserve was provided. All the Germans had to do was to select a point of attack along the extended front and attack it vigorously with superior forces. This they did, causing great demoralization, and severe losses in men and material. To save the reputations of the top British and American generals, the defeat was laid to the "greenness" of our troops. This outrageous slander against troops that had been well-trained—and therefore were not green, even though it was their first battle—and who fought most gallantly and efficiently under impossible circumstances against overwhelming odds, was a shameful incident, the truth of which should be brought out in our official history of this war. Never were excellent troops more mishandled and maligned. From all available information at this time, the British generals who intervened in the handling of this American corps were principally to blame. The incident should be studied as an example of the violation of the important principles mentioned above.

The initial success of the Germans at the beginning of the Battle of the Bulge was due, certainly in part, to our violations of the tactical principles discussed above. The area selected by the Germans to attack on December 16, 1944, was lightly held by American troops. This may have been entirely justifiable, as afterwards claimed by our high command. This is not the point involved, however. The fault rested not with the gamble taken to hold that area lightly, but with the manner in which the troops assigned to hold the area were dispersed.

Assuming that it was justifiable to hold the area lightly—the troops assigned for that purpose should have been kept in hand. The various units should have been kept in supporting distance of each other, and a general reserve held back, even though this would have left long portions of the front unoccupied. The vacant areas could have been scouted. When the attack came in great force, the commander of the area should have ordered his troops, not to hold at all costs, but to withdraw when their flanks were threatened with envelopment, and to fight delaying actions. This would have required the whole force to have been kept in hand instead of spread out so that the smaller units were completely out of touch with each other and there was no coördinated movement of the whole force. Delaying actions with the force in hand might not have resulted in much delay unless the troops were very mobile and could threaten the flanks of some of the German columns. The disjointed manner in which the troops did actually fight, however, effected no delay whatever, and resulted only in the utter destruction of some rather large units which might have been preserved to fight again as the resistance stiffened with reinforcements gradually brought in, as actually happened. The complete destruction of all of those troops originally holding the area was unnecessary and stupid.

Applying these same principles to the whole group of American armies, which included the Ninth, First, and Third, it must be remembered that this group was engaged in offensive operations, and gaps between them, under these circumstances, are not unnatural or necessarily due to faulty generalship. As long as each army was kept in hand, the gaps were not of serious consequence provided that a large general reserve had been established. To have proceeded without this reserve was a serious error. If there were not enough troops available to constitute this reserve, the whole front should have been shortened. It is a mistake to let the enemy induce you to overextend your forces merely because he has overextended his own. If he has so many troops available that he can cover a wider front than you, it is still a mistake to overextend your lines for that reason. Smaller armies have beaten larger ones by superior maneuvering, surprise, and good generalship. But no such success has ever been won by overextension without sheer luck, superior troops, or other factors which sometimes win despite bad generalship.

IV

Criticism of the manner in which mechanized cavalry reconnaissance groups were employed, especially by corps commanders, is justified. These squadrons were not armed, equipped, or organized to fight serious and prolonged actions, and they should not have been used on such missions. The best that could have been expected of them was to provide security against surprise and ambuscade of the units they were covering.

Mechanized cavalry was not organized to seize and hold critical points or ground until other troops could be brought up, to fight delaying actions, attack the enemy in flank or rear; maneuver in strength across country, fill gaps between large units, accomplish distant reconnaissance, or pursue across country on the flanks of the enemy. Security for other troops was the only, or almost only, mission for which they were suitable. And yet, they were called upon for other missions, which they performed as best they could, very gallantly and with heavy losses. Strong forces of horse cavalry were needed; however, had they been available it is possible that they would have been wrongly employed. The education at our service schools of our prospective leaders between World War I and World War II was not satisfactory in so far as the employment of cavalry was concerned.

V

The organization and training of a tactical air force as an organic part of our ground forces had been neglected during the 23 years between the two big wars. Just as the navy needs a carrier air force as a tactical part of a fleet, so must the army have a tactical air force as an adjunct to ground operations. American air authorities, however, considered a strategic air force of far more importance, and consequently, we entered the campaign in North Africa without a tactical air force specifically designed to work as part of our ground force command. The British RAF had made the same mistake all through the war up to that point, and we followed suit. The result was that our Allied ground forces did not receive the air support that the German ground troops did in that campaign. This was corrected only during the last operations of this campaign. In western Europe our air forces seem to have cooperated with ground troops very well, but this important element in an army should not have been left to improvization after the war began.

Conclusion

No one knows as yet how the development of the atomic bomb, robot airplanes and radar will affect the future of armies and navies. It is certain, however, that unless these new inventions of science bring about the certainty of permanent peace, armies and navies will be retained. The errors of the past, therefore, must be studied by military men, so that in the future they can be avoided.

Editorial Comment

E PLURIBUS UNUM

During the last two years or more a great deal has been written and spoken on the subject of unification of the armed forces of this government.

The problem has been discussed pro and con by our armed forces, the Congress and by the public and press until practically every argument for and against unification has been submitted. Further detailed discussion editorially in these columns would therefore only be repetition.

However, The Cavalry Journal feels strongly on the major issues. First, that the experiences of the war, and the carefully formulated statements of the country's foremost military and civilian experts, point to the inadequacy of our present organization to achieve its intended purpose. A careful analysis of the facts and figures of the past war has proven even to the most skeptical that the United States has problems which can be solved only by an overhaul of our armed forces machine. Even those who oppose the solution by unification agree to that. Second, whatever the decision is, it should be made promptly and positively. Further delay is extremely dangerous.

From an analysis of the testimony made public to date, it would appear that a majority of the opponents to unification are not so strong against unification itself as they are to the details for carrying it into execution. Of course there will be many "bugs" in the initial plans, but these so-called "bugs" will be gradually eradicated, and a feasible working plan will be formulated.

What are the problems involved in this plan of unification? In general they appear to be: (1) How to allot the proper share of the whole responsibility of military and naval defense between the three arms —land, sea and air. (2) How to amalgamate these three conceptions of mission into a joint strategic plan. (3) How to train combat units of these arms in peace to operate as a joint force in war. (4) How to obtain command and staff officers in each arm with sufficient knowledge of the purposes, methods and uses of the other two. (5) How to allot to each arm its proper proportion of the allotment of men and money and matériel set aside for military operations. (6) How to cut the cost of the armed forces' establishment to the lowest possible figure through joint procurement of common supplies and services.

Have not the experiences of the last world conflict proven that the conduct of modern war is possible only with unified command and joint operations? How then can these operations be assured?

It is a question of organization, method, technique. There is no question that, should war come, the need for command unity and smoothly functioning joint operations will be imperative.

In what way other than a single department can we have a smooth functioning command ready in war—a command ready to roll when the alarm rings in, because it existed, studied, trained, and acted as a unit in peacetime?

How, but in a single department, can we get the correlated training for efficient joint operations, eliminate absurd and unnecessarily costly duplications of effort in the purchase, storage, distribution, and issue of supplies and manpower to provide for the needs common to the air, ground and sea forces?

How else can be created and trained a team of co-equal arms as a powerful efficient instrument of protection for our national policy, and with a minimum budget made possible by the elimination of competitive interests?

Opponents of unification have, as a rule, based their objections on such issues as the loss of sentiment, tradition, and *esprit* under unification. They claim that one service might be in a minority, or that the operations might be in the hands of those who do not understand them—that with three services and two

top positions there will always be a time when one will not occupy a top position—that unification would eliminate healthy competition between the services. There are others, but like those cited above, there seems to be a pretty sane and practical solution for each objection. Most of these issues are mere details which can be ironed out for the common interests of our national protection. They serve only to cloud the main issue and its solution.

At the risk of going out on the deep end, The Cavalry Journal submits the following answers to the opponents of unification:

Sentiment, tradition, and *esprit,* under the present plan of unification, would not be lost. They would still be fostered and retained by personnel and units, the same as before. The air force, the army, and the navy would keep their separate identities and staffs.

As far as the minority issue is concerned, the very essence of the plan is that no service can go its own way without consideration of the *total* problem of military security. The Cavalry Journal cannot believe that persons who have reached the important positions as outlined in the plan would "gang up." How could the operations of any one of the three services be in the hands of those who do not understand them when the Chief of Staff of the Armed Forces is a policy and strategy official? Operations are left with the army, the navy, and the air force, or (in case of war) with the supreme commander in the field.

It is true that there are two top positions, but the professional heads of each service always sit in with the Joint Chiefs of Staff. Their views will always be heard.

There is still room for healthy competition between the services under the plan, and it will be *healthy* competition and not needless waste. A control at the top is just what is required to keep it from going from the *healthy* to the waste angle.

According to The Cavalry Journal's research in the matter of unification, the Secretary of War, Generals Marshall, Eisenhower, MacArthur, Arnold, Devers, Spaatz, Kenney, Doolittle and nearly all other officers who have had big war responsibilities are in favor of unification. The Joint Chiefs of Staff Special Committees were for it 3 to 1. The Joint Strategic Survey Committee comprising an admiral, a ground general, and an air general, were unanimously for it. At least 50 per cent of top naval commanders, when interviewed in 1944, were for unification. We have also been informed by reliable sources that the American Legion, the Reserve Officers and National Guard Associations are in favor of it. Seventy-five per cent of the Press, as shown by editorial comment, and 64 per cent of the public as shown by the Gallup Poll, are for unification.

Surely the issues are clear—the arguments have been heard. Further discussion would only seem to delay an important decision for purposes other than of national interest. Yes, the decision should be made promptly, and the plan put into effect immediately thereafter.

American Saddle Club

It is interesting to note the number of horse organizations that are springing up all over the United States. Groups of men, women, and children who share a common interest in the horse and in riding, are joining together for recreation and fun.

One of these organizations is the American Saddle Club. From what started as a simple effort to promote friendship, understanding, and hospitality among people who are fond of horses, has grown a national association of horsemen of every inclination. They now publish a monthly magazine called *The Quirt and Crop.* It is a very good little publication. If you are interested in horses, why don't you drop a line to Ray Fox (the Editor), Box 1227, Rapid City, South Dakota, and ask him to send you a sample copy and also all the dope on the association?

4th Armored Division Association

A group of former 4th Armored Division members are organizing the 4th Armored Division Association.

It is requested that all interested former members of the 4th Armored Division please notify THE CAVALRY JOURNAL of their present mailing address. We will be glad to forward this information to the acting secretary of the association.

No political or commercial aims are contemplated by this organization.

Armored Divisions' Combat Commands*

by Lieutenant Colonel Wayne D. Smart, Cavalry**

The armored division is organized to provide flexibility in the formation of tactical teams. The self-contained battalion is the basic unit.

Units are attached to the two combat command headquarters and to the reserve in accordance with the mission, the terrain, and the enemy situation. Additional separate tank battalions, armored or other infantry, artillery, engineer, tank destroyer, and antiaircraft artillery units, are attached as available and as the situation dictates. (Field Manual 17-100, The Armored Division.)

IN the organization of an armored division there are incorporated two groupings known as combat commands and a third grouping known as the reserve command. These groupings are so organized as to provide a task headquarters for any mission the division commander may designate. Field Manuals say little of these combat commands; yet usage and intent have materially affected the employment and success of all the present armored divisions.

During the early days of armor and amalgamation at Fort Knox, Kentucky, two historical cavalry regiments as well as a famed infantry regiment and artillery unit formed a command under the banner of the 7th Cavalry Brigade. The symbol of this unit was the familiar tank track and cannon on a "field" of cavalry yellow. Shortly after the gathering of these various units, the 1st Armored Division was formed and activated. When this occurred, the 7th Cavalry Brigade minus the infantry became the 1st Armored Brigade and a subordinate headquarters under the 1st Armored Division Headquarters. Its function was to coördinate the operation of the elements of the division during all tactical operations. It performed the function of command but not of administration. Being the only headquarters in the chain of command between division headquarters and the regiment, and operating actively then only during tactical phases, the 1st Armored Brigade soon assumed the characteristics of a "fifth wheel" in the chain of command. Its value was not underestimated nor was it poorly staffed. There existed a definite need for such a command but not merely as an adjunct to division headquarters.

With the activation of the 1st Armored Division the fact that there was only one brigade headquarters caused an unnecessary overlapping of command functions; so, at a critical moment in the fortunes of the Armored Forces, the combat commands were born. The combat command was the brain child of that Grand Old Man of the Armored Forces, General Adna Chaffee, who, sagaciously counselled by his staff of now famed leaders of our armored divisions, fostered the original idea and fondly watched its growth during his last years.

He visualized that the combat command would be a headquarters of a tactical nature to which could be attached any number of battalions or other units that might be required for a particular task. It is believed by older members of the Armored Forces that General Chaffee never intended that any set composition be made for any combat command, that it should be flexible and not permanent nor even semi-permanent. Its characteristic of being purely tactical in organization would have normally prohibited its retaining any degree of permanency.

However, during the past campaigns in Europe, many armored division commanders chose to create combat commands of fixed composition. Looking over reports, one finds the same units in Combat Command A throughout the entire European action, although it is certain that conditions varied from day to day as the battles progressed from St. Lo to the outskirts of Berlin. This tendency to fix the composition of the combat command restricts the inherent flexibility of the idea fostered back in Kentucky by General Adna Chaffee. This method of using the same combination is inclined to build up "the responsibility feeling" for the attached unit over and above that normally intended. It is inclined to take some of the division headquarters' duties and pass them on to the combat command headquarters which, normally, is not staffed to handle such extra problems. When the combat commands organize small task forces within the command, one begins to wonder just what the division headquarters is doing.

In some armored divisions which earlier operated under the old T/O, there was the matter of regimental headquarters to consider along with the combat command headquarters. Combat Command B of one armored division superimposed its headquarters on the regimental headquarters of one of its armored regiments, which was the largest headquarters in the combat command, for the operations in Africa. The double "issue" of staff officers for one position made some confusion initially, but in due time this was worked out. The need for extra liaison officers and replacements usually took care of any extra personnel. In other divisions which had similar organizations the creation of small task forces within the combat command took some of the regimental staff as commanding officers.

*Military Review.

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In the armored divisions, which were activated under a new Tables of Organization, there were many different interpretations of the functions and employment of the combat commands. Generally speaking, most of these new armored divisions utilized their combat commands as formations of standard size and type, assigning to them the same battalions regularly, and supplementing this organization with whatever other units not organic to the division there were available and suited for the particular mission. This idea violates the principle of flexibility set forth by General Chaffee; but the rebuttal points out that understanding and coördination are obtained between units which have worked together, that training, liaison, and coöperation reach their highest peak when elements continue their relationship day after day. One armored division in particular has followed the basic idea of General Chaffee in that no regular assignments were consistently made to each combat command. Each mission dictated the assignments of units to the combat command: that two up to six battalions may be attached to one combat command depending on the situation.

Some armored divisions made an equal split between the combat commands, giving to each CC an equal number of tank units, infantry units, and artillery. This "balanced" formation was particularly effective against a demoralized and defeated enemy. It is a formation which facilitates the exploitation of a hostile country. It can be further broken down into "task forces" within the combat command, as was frequently done by our armored divisions in Germany, in order to make rapid advances in multiple columns, to harass a worried enemy, and to disrupt any attempt to reorganize by a fallen foe. The principal disadvantage of this type of organization was found to be a dissipation of strength over the battle area. Plenty of harassing action was accomplished; but when the enemy defended in any sizable force, the small task forces were made to bypass these enemy strongpoints. The composition of a combat command using the "balanced" formation normally would be one tank battalion, one infantry battalion, and one artillery battalion. To this group were added some engineer, reconnaissance, medical, and maintenance elements. Any other troops, not organic to the armored division, would likewise be evenly divided among the combat commands. For a fluid situation such as we had in the closing days of the European war, this "balanced" formation worked fine.

Some armored divisions are reported to have favored the "unbalanced" type of combat command; that is, the armored division was organized into combat commands according to the type of weapon and equipment of the battalions. Consequently, one combat command would have attached most of the infantry battalions, and the other combat command would be composed mostly of tanks. Of course, these same combat commands would have other troops such as the engineers, reconnaissance, attached antiaircraft, tank destroyer, and supply support within the organization to make up the complete combat command; but their main force would consist of either tanks or infantry. Sometimes the abruptness of the division would be tempered by attaching a company of infantry to the tankers, and vice versa with the tanks to the infantry combat command. This combat command possessed great shock power in massing the tanks in one organization, and a good base of fire in the collected infantry battalions in the other combat command. When the artillery battalions were added, attaching one to the striking force and the remaining organic two to the base of fire, it made this formation one of the most powerful attainable. The arrangement had a few disadvantages. Theoretically, the base of fire would be in position to support the maneuvering force, the tanks; but reports from the European theater state that frequently the infantrymen of the base of fire would become involved in a local battle while the tanks were engaged in another some distance away. Both commands would ask for the other's support but would not be answered. Sherman was certainly right!

It has been discovered in such unbalanced combinations, the infantry attached to the tank combat command was not enough in number to support adequately the tanks and sustain the high casualty rate. The practice of fighting dismounted, caused by enemy actions, expended many infantrymen who were not protected by even the thin plate of a half-track vehicle. These men would endeavor to consolidate a position taken by the tanks, but with their few numbers they would be unable to withstand the strong German counterattack. The tanks in some cases would lend assistance; but normally in the German situation, they would continue attacking the enemy until they had outrun their infantry support. Frequently the strength of the attached infantry would be further dissipated by having to guard prisoners of war. Even the prisoners captured originally by the tanks would have to be turned over to the infantry in order to release the tanks for further gathering of prisoners, etc., etc. There is no question, but what this is one good use for armored infantry with tanks, but the point is that there are not always sufficient soldiers to "go around."

This is one of the points almost all armored division commanders agree on; that is, that the armored infantry should be doubled (and even some commanders think tripled) in a new organization of the armored division.

Another combination favored by one armored division was to retain division control of all artillery battalions. This policy was habitual unless the combat command was on a detached mission, in which case the necessary artillery would be assigned to it. The artillery so consolidated and controlled did not constitute a combat command. This arrangement meant that while no combat command had any artillery directly under its control, it was able to call for direct support from the combined artillery battalions and receive the maximum fire of the division, if the target warranted it.

The employment of a third combat command varies in different armored divisions. It is believed that this

combat command was first thought of as a reserve set up to act as a pool for all combat elements not assigned to combat commands. It was not used as a tactical headquarters except on a few rare occasions where the objective was very limited or the mission was a defensive one. The Tables of Organization do not allow many men for this headquarters, three officers and five enlisted men; so whenever this headquarters was considered for any contemplated action other than acting as a headquarters for the non-assigned combat elements, it would have to obtain additional staff officers from division headquarters to handle the situation adequately. Again, it has been pointed out, by one of our successful and famed armored commanders, that this thought was the original conception for this command by General Chaffee. He did not intend it to be a third combat command, although in some armored divisions it has attained a place "in the sun" equal to the other combat commands.

How about the organization of the armored division with its combat commands in the Pacific theater? We realize that there were actually only a few places where an entire armored division could operate. If the terrain did not restrict the employment of this organization, then the facilities to support such a unit were lacking or were considered beyond the value of the unit in the theater. Therefore separate tank battalions were used in this zone in conjunction with the infantry. These separate tank battalions might well have been consolidated under a combat command, but then the first thing that would have happened would have been the counterpart of an armored division. No, the mission of tanks in this area was to support directly the advancing infantry. The tanks of a battalion might well have been divided among the combat teams of the infantry divisions and have found that their chief rôle was supporting the doughboy. It is questionable if tanks would ever have operated alone. Rather, it was felt that tanks employed here must be more of an adjunct to the infantry elements and must lose their identity as separate tankers.

In this discussion of combat commands, there enters that radical but paradoxically same question, *Why combat commands?* Why should not the armored division be so organized, with regiments similar to the infantry divisions? These regimental headquarters with their more permanent staffs would supplant the combat command headquarters with its limited staff. Each regimental headquarters would have tactical and administrative control of all elements of the regiment plus any attachments. The regimental headquarters would take over all the functions now performed by both regimental and combat command headquarters.

Each regiment, of which there might be three in the Tables of Organization for an armored division, should have three battalions. Remembering the dire need for additional infantry, it has been proposed that these battalions be made up of three companies each, one of these companies to be a medium tank company and the other two, infantry companies, armored. Or, it has been suggested that one of the battalions be a tank battalion and the other two be armored infantry battalions. The important point is, in either combination, to have twice as many infantry as tank battalions. The regiment, in addition to the three battalions mentioned, should have the supporting elements such as reconnaissance troop, headquarters company, service company, and engineer company to make it a self-sustaining fighting unit.

This organization would present a working combination which has trained together and understands the mechanics of combined operations as they apply on the battlefield. The regimental staff is always employed in normal functions, both administrative and tactical. The size would be unwieldy but would present a formidable front to almost any opposition.

If the system of separate battalions is retained, then the organization of a combat command headquarters becomes essential. It is felt, however, that if this is the case it is necesary to build up the staff to such proper proportions that they are, in effect, a regimental type of headquarters. This would be inclined to make a combat command a permanent fixture, but flexibility may be maintained by rotating the attachments so that all the division elements become accustomed to each other.

From the discussion already presented, it can readily be seen that the subject of "combat command" is controversial and that a great number of differences exist among the various armored division commanders regarding the composition of the combat commands and their employment. Furthermore, there does not seem to be an accurate solution to the question in that all of the armored divisions have had outstanding successes in their campaigns and encounters against the enemy in Africa, Sicily, Italy, France, and Germany. This fact may prove the point that the type of organization is not the deciding factor in any battlefield success, but rather it is the amount of training and understanding that exists with all personnel, commanders, officers, and "GI's."

In conclusion, can it be said that any formation has the call over another? The "balanced" formation, that is, having at least two of the combat commands similar in organization, has obtained and won many followers because of its application and outstanding success in Europe. The "unbalanced" formation, that of having a striking force composed of the more maneuverable vehicles such as the tanks in one combat command and the base of fire element composed of the artillery and infantry in the other combat command, is theoretically sound and would be used properly against stiff opposition where the flanks cannot be turned in order to effect a breakthrough and exploitation. In both combinations we discover that the combat commands make up task forces; so we end up with the armored division spread out over the enemy like a giant who has tenacious tentacles . . . and after all, that's the idea, isn't it?

21st British Army Group in Europe, 1944-45*

Conclusion

The following article is the conclusion of a lecture given by Field Marshal Sir Bernard L. Montgomery before the Royal United Service Institution, the first part of which appeared in the January-February edition of* The Cavalry Journal. *The first installment told the viewpoint of a commanding general during a major campaign. This final installment tells of additional problems that were met, the special weapons that were used, and appraises the new tactics that were employed.

Grouping

TO be successful in battle the fighting machine must be so set in motion that it can develop its maximum power rapidly, and the troops must then be launched into battle properly; in fact, what I call "Stage Management of the Battle" must be first-class. The plan of battle must be made by the commander, and in it he must give careful thought to the correct grouping of his formations, his armor, his artillery and other resources. Throughout the battle area the whole force must be so well balanced and poised that there will never be need to react to enemy thrusts; these can then be disregarded and the battle forced relentlessly to swing your way. This requires that the commander should always be thinking far ahead, although of course his final decisions of grouping must await full development of the problem. Skill in grouping, and in quick regrouping to meet the changing situation, is a very great art, and it requires much study before proficiency is obtained.

Consider the Battle of Normandy. I have shown how it was developed and accomplished according to the plan made well before D Day,* and you will notice that the grouping of our resources was such that the enemy was unable at any time to cause us to deviate from our purpose. We held the initiative throughout, and we arrived where we meant to be on time—in fact about a fortnight early. I have already given other examples, particularly in connection with the Battle of the Rhineland and the Battle of the Rhine.

It is worthy of note that in this campaign grouping, and the preserving of correct balance, were more vital than ever. In the northern sectors the magnitude of our commitments compared with available resources made it impossible to provide the text book scale of reserve formations, or indeed anything approaching it.

Administration

In the early stages of the campaign much depended on the successful issue of the administrative planning. The task was a formidable one, and in plain terms meant the export overseas of a community the size of the population of Birmingham. Over 287,000 men and 37,000 vehicles were pre-loaded into ships and landing craft prior to the assault, and in the first thirty days 1,100,000 British and American troops were put ashore.

There was the necessity to foresee and provide all that is required for a major static battle quickly followed by a rapid advance of some 400 miles, which entailed the landing of some 200,000 vehicles and 750,000 tons of stores during the corresponding period. And I can say that even in these exceptional conditions planned operations were never held up even for a single day by any lack of administrative resources.

In the early stages the vast quantities of stores required were landed over open beaches, a task which was greatly assisted by the Mulberry. The stores were directed into a number of field depots, whence they were dispatched to the troops. As soon as conditions permitted, these field depots were concentrated into a single organization called the Rear Maintenance Area.

When the break-out from Normandy occurred, considerable problems arose because the lines of communication became stretched in a short time from Bayeux to Antwerp—that is some 400 miles. All bridges over the Seine were demolished, and the railway facilities extensively damaged. In order to maintain the advance, shipping and the discharge of material were cut well below the figure necessary for the daily maintenance of the force, so as to release every lorry possible for ferrying

★*The Journal, Royal United Service Institution.*

*See The Cavalry Journal, January-February, 1946.

stores forward to the troops. We were thus eating into the reserves built up in the Rear Maintenance Area, and it became a matter of urgency to get bases farther forward and shorten the lines of communication. We had both feet off the ground, relying on opening up the Channel ports, particularly Dieppe, before our accumulated stocks became exhausted. But you have to take administrative risks in war as well as tactical ones; the point to realize is that a commander requires a nice judgment to know when risks are justifiable and when they are definitely not so.

Gradually the railway systems were re-established, and when eventually the port of Antwerp was opened to shipping, we were able to base ourselves firmly on depots established between there and Brussels. We continued to handle subsidiary tonnages through the Channel ports.

I would mention one very important feature of administration which has been confirmed during the campaign. It is that there is a reasonably constant figure covering the combined ammunition and petrol tonnages required, though of course the split between these commodities depends on the type of battle you are fighting.

It is not possible in such a short survey to go into any detail concerning the vast and complicated machinery necessary for the support of a modern army in the field. I will, however, mention the tremendous importance of Movements and Transportation. Their problems in this campaign were immense. There were the numerous technical and engineer problems of repairing and operating the damaged or demolished ports, railways and inland water transport systems of 4 European countries. Bridges had to be built over such obstacles as the Seine and the Rhine. Possibly even more important was the problem of coördinating and allocating traffic over the various means of carriage, and of setting up organizations for operating through services over the different national systems.

The "A" services, too, were confronted with special problems. The calculation of reinforcements required, together with a correct balance for every arm and trade, called for considerable foresight and experience, and had a very direct effect on the success of operations. I will also mention Welfare, which has reached a standard in the army probably never previously approached.

Very great praise is due to the various services and departments which so successfully overcame their problems and difficulties and carried out their functions in such an efficient manner.

Specialized Equipment

Early in the planning for D Day it became evident that specialized armored equipment would be necessary to overcome the beach defenses. One of the recommendations made as a result of the Dieppe raid had, in fact, been that engineers should be carried behind armor up to the concrete obstacle which had to be breached. This idea was developed so that mechanical means could be used for placing or projecting charges from tanks without exposing the crews. Tank-carried bridges for crossing antitank ditches were developed as well, and were launched mechanically from behind armor. (See *"Bridge Laying By Armor,"* The Cavalry Journal, September-October, 1945.)

The study of the particular problems presented by the Normandy beach defences led to the preparation of further specialized equipment. Mats laid from tanks were used to cross soft patches of clay on the beaches; a turretless tank was used as a means of providing a self-propelled ramp over which other vehicles could scale sea walls; flail tanks for mine clearing and amphibious tanks to lead the assault were ready by D Day, and were integrated with the engineer tanks into well trained assault teams.

Specialized armor made an important contribution to the success of the landings. The beach defences were quickly overcome and the new technique of landing a great weight of armor early in the assault paid an excellent dividend.

As the campaign progressed, the need for special armored devices became increasingly apparent. Against fixed defenses such as existed around the ports, mine-sweeping tanks, flame throwers and engineer tanks were invaluable. The Churchill flame thrower was outstandingly successful throughout the campaign. It has a very great moral effect on the enemy and saved us many casualties.

The D Day technique for the early landing and quick build up of armor was also applied at the crossings of the Rhine and the Elbe. This was made possible by the use of amphibious tanks and amphibious assault craft carrying infantry, light vehicles and supporting weapons. It was largely the use of these craft which allowed operations to be continued throughout the Winter over the flooded areas between the Maas and the Rhine.

Armored personnel carriers were also found to be neccessary, and were improvised from tanks with the turret removed. Their use gave armored mobility to infantry and enabled them more closely to accompany armor in the assault and pursuit. The vehicles, known as "Kangaroos," I shall mention again later.

All these various equipments were concentrated, for training and administration, in a special formation, the 79th Armored Division. They were sub-allotted in support of formations and units as operations required. The divisional commander was responsible for providing competent advisers in the use of the equipment at all levels. It was found that centralization under him was essential in order to achieve flexibility and provide a controlled program of workshops overhaul, rest and relief.

The Royal Armored Corps

The Royal Armored Corps lived up to its highest traditions in this campaign. It was really properly equipped

with adequate scales of reserves, and the fighting gave full scope to its flexibility and adaptability.

The outstanding point which emerges once more is that we require only two basic types of tank—the capital tank (for fighting) and the light tank (for reconnaissance). The capital tank must be a weapon of universal application, suitable not only for working with the infantry in the attack and in the dog-fight battle, but also capable of operating in the spearheads of the armored division in pursuit. I am convinced, as a result of experience from Alamein to the Baltic, that it is fundamentally unsound to aim at producing one type of tank for coöperation with the infantry and another for the armored division. We require *one* tank which will do both jobs. I have learned that the ubiquitous use of armor is a great battle-winning factor.

Artillery

The gunners have risen to great heights in this war and I doubt if the artillery has ever been so efficient as it is today.

In considering the future of the artillery, it is very important that we should get the organization right, with the correct balance between tracked guns and towed guns, and so on. The expenditure of ammunition in this campaign has been tremendous, and as a result of the experience we have gained, certain facts have emerged. It has been found that a large *number* of small shells over a given time produces a greater effect on the enemy than the same *weight* of larger shells. It is, moreover, important to remember that there is a time limit for bombardment, after which enemy morale gets no lower and further expenditure of ammunition is wasted. We have found that our own casualties rise in direct proportion to the distance of the infantry behind the artillery supporting fire.

All these facts point to the need for relatively small shells for close support of infantry, where neutralization and not destruction is the immediate object. The 25-pounder meets the case; it must have good fragmentation. I would mention the fuze problem as this requires study and development. We must have a good proximity fuze and a good time fuze.

Lastly, the Air Observation Post. The Air O.P. has proved its value in this campaign. It has become a necessary part of gunnery and we must press for a good aeroplane for the job. Very good R.A. officers are required for duty in the squadrons, and they must be selected with this in view. Primarily an Air O.P. officer must be a good gunner—it is not difficult to teach him to fly.

The Engineers

The engineer problems were unusually formidable, and had to be executed at a great speed.

In the early days the clearance of beach obstacles and mines gave rise to great anxiety and called for prolonged and detailed study. The problem of placing the Mulberries or artificial ports was solved by the excellent coöperation between the Royal Navy and the engineers on both sides of the Channel. As the beachhead began to expand, we were faced with demolitions on a grand scale—demolition of ports, railways, bridges and airfields—combined with extensive and very skilful mine laying.

The repair of well-blitzed and intentionally demolished airfields, or more often construction of new ones, was in itself a major task upon which depended our support from the air.

Twin petrol pipelines were laid from Cherbourg across the Seine at Rouen, and from Boulogne stretching across the Rhine. These were supplied from ships pumping ashore, and later in particular from the famous "Pluto." (See *"Operation Pluto,"* The Cavalry Journal, July-August, 1945.) The pipelines transported during the campaign more than a million tons of petrol.

We erected nearly 2,000 Bailey bridges, including spans across the Seine, the Meuse, the Rhine and the Weser, some of which were nearly a mile long. It has once more been shown that rivers, even very big rivers with complete demolition belts, do not hold up an army, in spite of the weight of modern traffic.

Armor and the mass of lorries assisting the Army played havoc with the roads, and the maintenance of them in conditions of continual traffic, especially in low-lying districts in severe Winter conditions, was perhaps the most heart-rending task that faced the engineers. They were greatly assisted by the Pioneer Corps, which in this task, as in so many others, did a very excellent job.

The most determined demolitions were in the ports. But we have proved that it is impossible to destroy a port so badly that it cannot be put into some sort of operation by the time the navy has cleared the mines obstructing its entrance.

The sappers were very well equipped, but it is important to remember that it is the human element—the resourceful officers and skilled and willing men—which is the major factor in engineering in war. We were often very short of sappers, particularly during the big river-crossing operations.

Signals

It is fundamental that successful operations demand really efficient communications. It is therefore worth emphasizing that a commander, at whatever level, must take his Royal Signals adviser into his confidence from the earliest stages in preparing a plan.

Much of Signals' work was of the unspectacular, slogging variety which the provision of a vast network of communications involves. The constant aim of Signals was to build up the solid cable head as far forward as possible, to provide reliable jumping-off places for communications in the battle area. To serve my own tactical headquarters, which frequently moved at intervals of every two or three days, use was made of

an ultra high-frequency wireless of an entirely new type (No. 10 set). This method gave me secure speech communication with my armies and my main headquarters.

I think that one of the main Signals lessons has been the necessity for insisting that the officers reach a really high standard of technical ability. Modern equipment becomes increasingly complicated and diverse, and the officers must know all about it if they are to get the best results.

The Infantry

In spite of predictions to the contrary, the infantry has lost none of its importance on the battlefield. Modern infantry is a master of more weapons than ever before, and the infantryman's life depends primarily on the skill with which he uses them; he must reach an increasingly higher standard of training. It has been a war of movement; but although the infantryman may motor into battle, his training must keep him hard and tough—a point which must never be overlooked in these days of troop-carrying transport.

The introduction of the armored personnel carrier is an important innovation in the employment of infantry. It enables infantry to be transported across bullet-swept zones in order to arrive fresh at the vital part of the battlefield. The development of this technique has already gone far and done much to enlarge the scope of infantry tactics. For example, in the first major attack by the Canadian Army astride the Falaise road on August 7th, infantry carried in "Kangaroos" were moved by night a distance of five miles to their off-loading point; the last three miles of this advance were actually within the enemy positions, and the troops debussed almost on the edge of the enemy gun areas. They then fanned out to overrun the belt of country they were attacking.

The tendency to do more and more by night has been greatly facilitated by the provision of "artificial moonlight." Artificial moonlight, provided by searchlight batteries, has now become a standard part of our military organization and has greatly assisted the activities of the infantryman. It has also proved its value in the more rearward areas to the bridge builders and administrative echelons. (*See story in this issue.*)

It has again been the infantry who suffered the heaviest casualties. I cannot praise too highly the stamina and persistence which the Infantry displayed in the campaign. Divisions were called upon to remain continuously in action for many months on end. To this they responded admirably, even during the very bitter Winter we experienced.

Airborne Forces

Airborne forces must now form an essential part of the army, as there will often be occasions in which they can play a vital rôle. Apart from their participation in the battle, the threat of their use can be turned to important advantage, for experience has shown that thereby the enemy can be led to make considerable and even vital dispersions of his front line forces. This is in addition to the need to lock up troops in rear areas for guarding vital zones and installations when the opponent is known to have airborne troops at his disposal.

The use of airborne forces in highly mobile operations is limited, because the time required for planning their descents frequently results in the ground troops overrunning the projected dropping zones. But in deliberate operations, such as the seaborne assault or the assault across a major river obstacle, airborne troops have proved to be a battle-winning factor.

The threat of an airborne operation, in conjunction with other factors, was material in causing the Germans to retain major formations in the Pas de Calais during the initial period after our landing in Normandy. Nearer the battlefield, uncertainty as to our intentions, combined with the use of dummy paratroops, caused alarm and despondency to the enemy. This delayed the arrival on the battlefield of portions of his forces at a vital time.

There are a number of limitations in the use of airborne troops, chief of which is the uncertainty of weather. But I believe this factor will become less important in the future as scientific methods are developed to facilitate the use of aircraft under adverse weather conditions.

I think we must re-examine our present organization of the airborne division. I should like to see the paratroops and the glider-borne elements combined together in a standard type of brigade since, once it reaches the ground, the airborne brigade fights as infantry.

The Medical Organization

No account of this campaign would be complete without some mention of the truly remarkable success of the medical organization. But it must be remembered that there were two factors which contributed greatly to the results achieved; probably no group of doctors has ever worked on better material and, secondly, they were caring for the men of a winning army. The men of the 21st Army Group were fully immunized and fully trained; their morale was at its highest; they were well clothed and well fed; they were fighting in a climate to which the average British soldier is accustomed; hygiene, both personal and unit, was exceptionally good; welfare services were well organized. The exhilarating effect of success also played its part in reducing the rates of sickness.

Commanders in the field must realize that the medical state of an army is not dependent on the doctors alone. Their efforts are immeasurably facilitated when morale is at its highest, and of all the factors which insure a high state of morale, there is none more important than success.

The sickness amongst troops was almost halved as compared with the last war. It is striking that, as we

swept through Germany liberating prison camps such as Belsen and Sandbostel where thousands of persons were dying of typhus, only 25 British troops contracted this disease. None died of it. This was due to preventive inoculations and to the adequate supply and use of a powder called D.D.T.

Air transport has been of great importance in the evacuation of casualties. By this means over 100,000 wounded men were evacuated to base hospitals from front line units. In the sphere of transfusion, great quantities of blood and blood plasma were used. A coördinated service of air transport and refrigerator trucks insured that fresh blood was always at hand for surgeons working directly behind the lines, even during the rapid advance into Belgium.

Another interesting fact is that in the last war two out of every three men wounded in the belly died. Field Surgical Units, operating close behind the lines, greatly reduced this danger. In the Normandy campaign two out of every three men wounded in the belly recovered.

The healing of war wounds has been revolutionized by the use of penicillin. Many men, who in the last war would have been permanent invalids, were fit and ready to go back to the line within a month of being wounded.

To sum up, the doctors were prepared to lay 15 to 1 that once a man got into their hands, whatever his injury, they would save his life and restore him to health. It is a fine thing that these odds were achieved with a handsome margin.

Conclusion

I must emphasize that my narrative has been concerned with the 21st Army Group, but it is well to remember that any complete story of the campaign in north-west Europe would tell you more of the tremendous effort of the United States and of the fighting on the more southerly sectors remote from the 21st Army Group zone.

I would also say that the scope here has permitted only the briefest reference to our great Russian ally, but we must remember that the Russians bore throughout the greatest weight of the enemy onslaught on land.

Events have amply shown what a splendid spirit of coöperation was achieved in this war between the navy, army and air force; I doubt if such a smooth and efficient system of working together has ever been achieved before. This applies equally to the relationships between the three British Services and their American counterparts.

It has been brought home to me, not only in this campaign but throughout the war, that the soldier on the battle front and the worker on the home front are closely linked members of the same team—neither can achieve any success without the other; both have to stand firm under fire and both have to see that their job is carried on in spite of all the enemy can do.

In this war the civilian on the home front has shown the true British spirit of determination to carry on, in spite of every difficulty and every danger that the enemy could cause. If he had not done so, the soldier on the battle front would have fought at a very great disadvantage.

In conclusion, I wish to pay tribute to the splendid fighting spirit, heroism and endurance of the ordinary soldier of the British Commonwealth of Nations. Once again he has indeed proved himself second to none. And if I were asked what is the greatest single factor which contributed to his success, I would say morale. I call morale the greatest single factor in war. A high morale is based on discipline, self-respect and confidence of the soldier in his commanders, in his weapons, and in himself. Without high morale, no success can be achieved—however good may be the strategic or tactical plan, or anything else. High morale is a pearl of very great price. And the surest way to obtain it is by success in battle.

Excerpts from Secretary Byrne's Speech, February 28, 1946

"While it is not in accord with our traditions to maintain a large professional standing army we must be able and ready to provide armed contingents that may be required on short notice. We must also have a trained citizenry able and ready to supplement those armed contingents without unnecessarily prolonged training.

"That is why in the interest of peace we cannot al low our military establishment to be reduced below the point commensurate with our responsibilities, and that is why we must have some form of universal military training."

The "Snake"

by Major Thomas W. Wood*

THE minefield-clearing "Snake" has been a paradox in its effectiveness and lack of use. Originating in Bangalore, India, where bamboo stalks were first filled with explosives and pushed by hand through enemy defenses to clear a safe path, the Snake is a large bangalore torpedo which is pushed by a tank.

The Snake is a long and narrow semi-rigid metal shell filled with explosives, and can be assembled in lengths up to 400 feet. It is put together in an area removed from enemy fire, towed by the tank to the edge of the minefield, then pushed by the tank into the field and detonated. The blast pressure set up by the terrific explosion of 4,500 pounds of amatol destroys all mines down its length and far enough to the sides to provide a mine-free lane through which tanks or other forces can advance. This is the only known method of quickly obtaining a completely cleared lane through a minefield without exposing personnel to small-arms fire.

In the Anzio break-through of May 23, 1944, the Allied columns of tanks, tank destroyers, and infantry advanced through two lanes blasted by Snakes across dense and deep minefields, and quickly gained their objective against a surprised enemy. Near by, in another combat command, where Snakes also had been prepared but at the last minute were not used, 30 tanks were lost when the unit made a similar advance. This attack was over ground which prohibited the use of mine detectors because it was littered with shrapnel from four months of heavy fighting.

The Engineer, AFHQ, wrote of this: "Judging from the success of the operation described, it is believed that the Snake will prove to be a very worthwhile weapon." This echoed the belief of those who had followed its development in this country and had seen it employed in demonstrations. Yet the Snake was never again used in combat after Anzio. Some of the reasons why may be found in a description of what the Snake is and how it works, as well as a further examination of the combat reports from Anzio. These may likewise show that there is now ample justification for the belief that the Snake may be "a very worthwhile weapon."

The British recognized the need for an effective mine-clearing weapon in the early days of the war in Africa and suggested, as an answer, large bangalore torpedoes which were made by filling lengths of pipe with explosives. It was known that enough explosives in the right place would accomplish the job. The problem was to find an effective means of placing the line charge across the minefield. Actual development of a device to accomplish this was a continual compromise between providing enough explosives to detonate known enemy mines, and the many factors that came into manufacture and tactical employment, such as weight and bulk, field assembly time, special training required for personnel, hazards to friendly troops, tank attachments required, availability of critical materials, and a host of other items.

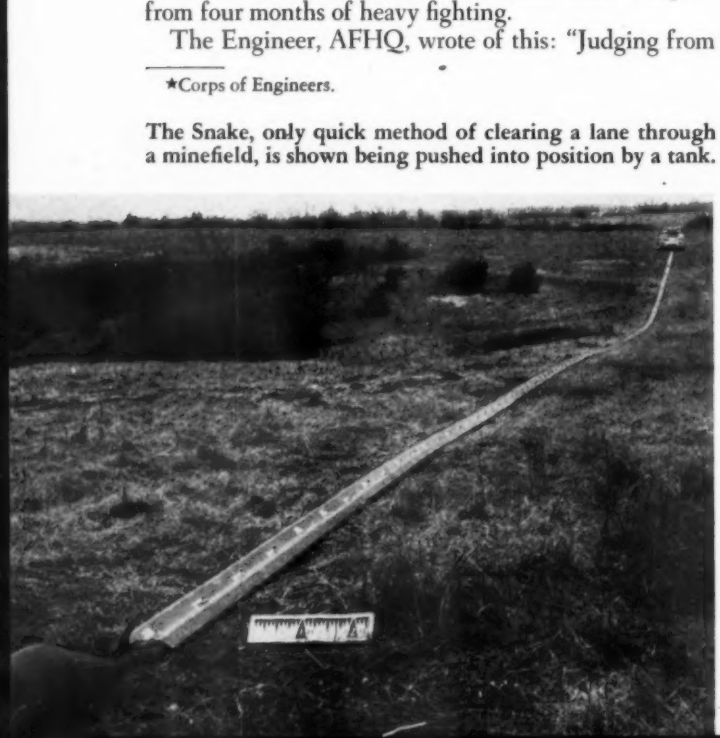
The M3 aluminum Snake, as finally developed, consists of two parallel linear explosive charges encased between corrugated metal plates, bolted together to form an assembly which can be towed or pushed by a light or medium tank. It is flexible in vertical plane to permit it to pass over rough ground, and rigid enough in horizontal plane so it will maintain a relatively true course when being pushed. The assembled M3 Snake is 14 inches wide, five inches high, and 400 feet long. It weighs approximately 9,000 pounds, including 4,500 pounds of explosives.

The explosives are contained in elliptical aluminum-cased cartridges, 5 feet long, approximately 5½ inches wide by 3¾ inches high. Each cartridge weighs 40 pounds and contains 35 pounds of amatol, an insensitive high explosive. One end contains a cap-well to receive a standard blasting cap, which is for use when and if the cartridges are diverted from their normal use in the Snake and are employed for general demolition work.

The Snake is exploded by machine-gun fire from the pushing tank against one of two impact-type fuzes. Two

*Corps of Engineers.

The Snake, only quick method of clearing a lane through a minefield, is shown being pushed into position by a tank.



such fuzes are provided in case one is damaged in use or defiladed from the tank gunner when the Snake is in the firing position.

A pear-shaped nose, which allows slight movement in all directions, is connected to the front of the Snake. This keeps the end from digging into the ground, and helps guide it around trees, over ditches, etc.

Assembly of the Snake is accomplished ordinarily by a specially trained crew consisting of one platoon. In daylight, assembly time is approximately one hour after all materials are on the site; at night, under adverse conditions, the time is double. The training of a tank crew to handle the Snake requires about a week.

A properly constructed Snake can be towed for miles over good terrain without showing signs of serious weakening. It can be pushed a distance of about 400 feet in the direction in which it is headed, and must be fairly straight before the pushing is commenced.

It is advisable for friendly infantry within 250 to 800 yards to the sides or 250 to 300 yards to the rear of the Snake to take cover to avoid flying fragments when it is detonated. There is little danger to a man close to the ground, or behind any sort of cover even if he is much closer than the given distance. A man in a foxhole probably would suffer no great harm at 25 yards.

Detonation leaves a well defined crater which plainly marks the cleared lane through the minefield for the passage of tanks or assault forces.

The Snake contains 50 per cent more explosive than the famous "Block Buster" bomb, and therein lies one reason why it was used but once. To the infantryman, the tanker, and all others who do not ordinarily handle explosives, 100 pounds is a tremendous quantity. Speak in terms of 4,500 pounds, and the average listener will express disbelief that you can live within a mile of it. So it is not surprising to read in the report of the Engineer, Fifth Army—"It was noted during the (Anzio) operation that our own infantry and tank men were very much afraid of Snakes. This fear was one of the main reasons the (other) combat command did not use them. Previous to any similar operation in the future, infantry and other troops should be given special Snake training and orientation." In the operation, friendly infantry who were about 100 yards from the scene asserted that they had been "knocked over."

The present M3 Snake has been greatly improved over the steel M2 employed at Anzio. Both encasing plates and cartridge shells are made of aluminum. Now 50 per cent of the total weight is in explosives, whereas with the M2 Snake, only 25 per cent was in explosives. It is easier to assemble and it is safer to use because fragments have been greatly reduced by the use of aluminum, much of which is actually consumed by the explosion.

The improvements made are important. In a discussion of the M3 Snake with a member of the Sixth Army staff shortly before the end of the war, he stated that they intended to carry this Snake on the planned operation into Japan.

From the logistics standpoint, it is to be noted that if no use is found for the Snake in clearing a minefield, its aluminum-cased cartridges can be used as explosives. They are highly efficient packages of explosives either for assault or general demolition. Newsreels of combat scenes in Aachen, Germany, showed a streetcar being loaded with explosives behind the U. S. lines and turned loose to roll down hill into the well-emplaced Germans. Those explosives were Snake cartridges.

Designed to weave its way around or over obstacles, a Snake is shown being pushed through jungle terrain.

The impact fuze that comes with the Snake is not the only way it can be detonated. At Anzio, the troops had rigged up an improvised firing device consisting of an M1 antitank mine with a steel plate welded to the spider and strapped to the top of the Snake in lieu of the usual, similar, firing device. In the excitement, when the first burst or two of machine-gun fire failed to register on the detonating device of one Snake, the gunner fired a point-blank HE round from the tank's 75mm gun. This registered squarely on the Snake, and did the trick nicely. Perhaps the thought that an enemy gunner might also register on the Snake has been a major deterrent to enthusiastic acceptance by tankers.

As a matter of fact, 60 feet of the tail end of the Snake is loaded with sand bags and not explosives. Almost a direct hit would be required. Tests have shown that high explosive 105mm projectiles must land

within one yard of the Snake to detonate it. If a Snake should be hit or detonated accidentally for any other reason while being pushed into final position by the tank, nothing more would happen to tank or crew than if the Snake were fired as intended. Should the Snake detonate while being towed, however, the tank engine might be temporarily stalled and the result would be more telling.

The forward 20 feet of the Snake is also dummy loaded. Thus, if a mine should be set off by the nose as the Snake was being pushed into position, the Snake itself would not be detonated.

To quote again from the Anzio report: "The two engineer guides . . . began leading the tank-towed Snakes from the assembly area to two gaps in the friendly minefields guarding front line positions. . . . Two Snakes had been placed in line in each gap, the leading Snakes stretching to points about 285 yards into No Man's land, the tails of the rear Snakes approximately even with the beginning of the gap. . . . The towing tanks then backed out over the Snakes and retired." To back a tank over a Snake is dangerous. The tactical situation, where the Snakes had first to be towed through gaps in friendly minefields, may have left no other alternative than to back out over them. The Snake, however, might have been set off at that time by an enemy hit or an accidental strike on the firing devices, or by the tank's getting off center and crushing the explosives hard between the metal plates. An explosion under the belly of the tank would have wrecked the vehicle and killed the crew. After towing a Snake into the position from which it will later be pushed, if at all possible the tank should give the Snake a wide berth. The recommended technique of employment calls for two tanks. Until immediately before H hour, the Snake and the two handling tanks remain under cover behind the lines. At H hour, the towing tank moves the Snake to the edge of the minefield. This can be done at a speed of about four miles per hour. This tank then cuts loose and immediately turns off to the flank. The other tank, which has followed closely behind, then engages the pushing hook and, in an operation which requires about three minutes, pushes the Snake into firing position. The pushing tank backs off a few feet and fires the Snake. The ensuing smoke and dust provide excellent screening for an immediate push through the gap.

In summary, the principal facts concerning the Snake and its employment are:

The Snake is best suited for breaching minefields in a situation that has remained static for some time, although if the supplies are on the site, it can be assembled and employed on several hours notice.

The limits of the minefield to be breached must be known, and the near edge must be plainly marked.

The approach from the Snake assembly area to the minefield must be suitable for bringing up Snakes.

Because of the slow speed at which the tanks handling it move, employment under cover of darkness or smoke is advisable.

Adequate Snake training and orientation must be given tankers and accompanying infantry. There is no undue hazard when employed by well-trained troops.

The aluminum Snake (M3) is light enough to warrant carrying it on an operation with the view of using the cartridges as ordinary explosives if the situation, as it actually develops, should not require the Snake as such.

Upon detonation, the Snake clears a marked path—even in jungle growth—over which troops can advance.

The Comet—
Heavy Cruiser Tank

*by Major J. R. W. Murland**

After the British Cromwell tank came its successor, The Comet, more heavily armed and with thicker armor, but with no less speed. Its main armament is the new 77mm, which is carried in addition to two 7.92mm Besa machine guns. Speed is 32 miles an hour.

British Official Photo

Special devices for sighting and laying its guns are an outstanding feature of the Comet, new British tank, one of which is shown approaching the Weser bridgehead.

SOME time before Britain's Cromwell tank made its first and extremely successful appearance in action, the design of its successor, the Comet, was already well advanced. Battle reports on the Comet, first employed in March, 1945, showed that the new tank not only represented a great advance over its predecessor as a weapon of war, but had also demonstrated a similar degree of mechanical reliability—one which would have been considered fantastic a few years ago.

When the question of a successor to the Cromwell was first contemplated, the designers faced the inevitable conflict of military requirements. It was clear that the paramount needs were for a heavier armament together with thicker armor; at the same time it was considered that little, if any, of the Cromwell's great speed could be sacrificed. That this was achieved without the sacrifice of any military essential can only be regarded as something of a miracle.

Beats The German "Tiger"

The gun selected for the main armament of the Comet was the new 77mm, which combines a good armor-piercing quality with the ability to fire a most effective high-explosive shell. It is of interest that the armor-piercing performance was better than that of the 88mm KwK 36 gun, which was mounted in the much publicized German Tiger tank. The Comet also has two 7.92mm Besa machine guns, one mounted in the turret co-axially with the 77mm gun, and the other in a ball-mounting in the front of the hull. Sixty-one rounds of ammunition for the 77mm are carried, together with 5,750 rounds of machine-gun ammunition.

Special devices were designed for sighting and laying the 77mm and Besa turret guns, and are one of the outstanding features of the Comet. It is not possible to describe these devices in detail, but it can be said that they represent a departure from any previous practice in many respects; the methods of sighting and laying insure the greatest possible accuracy at all combat ranges, and with this equipment the 77mm is at present the most accurate British tank gun.

The adoption of the 77mm gun made it necessary to increase the diameter of the turret ring to 64 inches, which is 7 inches more than that of the Cromwell. The over-all dimensions of the Comet are also slightly bigger. It is 21 feet 3 inches long, 10 feet 1 inch wide, and 8 feet 9 inches high, and weighs almost 33 tons.

Established British Lay-Out

The general lay-out of the tank follows established British design, and a crew of five men is carried. These

*Fifth Royal Inniskilling Dragoon Guards.

are the driver, hull-gunner, commander, turret-gunner, and loader wireless-operator, the last three being accommodated in the turret. The turret traverse is power-driven, and has a full traverse of 360 degrees.

The radio equipment in the Comet is most comprehensive. Basically, it follows previous practice, allowing simultaneous telephonic communication on two channels, one to higher formations within medium range, and the other to tanks within short range; the usual inter-communication between members of the crew is also provided. In addition to these facilities, which have been standardized in British tanks for several years, there is a further radio-telephone channel for communication with the infantry or other troops with whom the tanks may be coöperating.

In several respects the appearance of the Comet is similar to that of the Cromwell, but there are two features which prevent confusion between the two. One is the external gun mount, and the shape of the turret, which is more squat on the Comet. The other is the four rubber-tired rollers on each side of the Comet which carry the top run of the track.

The remaining suspension details follow the usual design for British cruiser tanks: Christie high-speed suspension is employed, with five large road wheels on each side; and a Rolls-Royce "Meteor" petrol engine of 600 horse power, which gives the Comet a maximum speed on roads of approximately 32 miles per hour.

Transmission and Steering

The transmission and steering system do not call for any particular comment; the Merritt-Brown controlled differential steering system is employed, which gives a positive drive to both tracks at any radius of turn. This system was first used on the Churchill tank, and since then it has been standardized on all British tanks. It is very compact, making it possible to accommodate the entire engine and transmission in the compartment of the hull behind the turret. Two rear sprocket wheels transmit the drive to the tracks.

The Comet was first used in action in the exploitation that followed the Rhine crossings, and it formed the equipment of the well-known 11th Armored Division in its advance from the Rhine to the Baltic. During the last 46 days of the war in Europe, the exploits of this division were continually in the news, and its progress could be followed as it moved forward through Osnabruck, Luneburg, and Hamburg. It was a severe trial for a new tank which, although severely tested during its development, was being subjected for the first time to the special strains of battle. As has already been stated, excellent reports were received of its performance and reliability.

The Comet is standard equipment in armored regiments, and it has the peculiar distinction of being the only British tank which has never been in action outside of Germany.

Artificial Moonlight*

ABOUT three years before the war a new special searchlight was accepted by Britain's War Office. It was later mounted into a tank turret and, for security reasons, called the Canal Defense Light.

There was nothing new about the principle of this particular invention, but it had certain distinct advantages over previous models. The inventors had succeeded in mounting inside the limited space of a tank turret a power unit capable of producing a light of several million candle power. This could be projected through a narrow slot to produce a flat beam, roughly fantail in shape, and later known as "artificial moonlight," which would cover a frontage of about 350 yards at a range of 1,000 yards. The light could not be extinguished by small-arms fire, although it was vulnerable to antitank weapons. It also had a flicker device, which it was claimed would dazzle onlookers and might induce temporary blindness.

During the months before D Day it was found that some of the earler claims for the light had been slightly extravagant, but that the CDL had two definite advantages worth exploiting.

First, when CDL tanks were used to light up a wide front it was possible locally to turn night into day, and thus enable the pursuit of a defeated enemy to continue throughout the 24 hours. Even if not augmented by infantry the aimed fire power of the tanks and artillery was impressive; direction-keeping during a night advance or assault was greatly facilitated, and might prove decisive against an enemy on the run.

Secondly, at night the light provided an improvement of the age-old adage, viz: attack with the sun behind you and in the eyes of the enemy.

Various American units were trained, and equipped, and went with the British-trained groups to the Continent. The Normandy bridgehead breakout went so fast that it was impossible to use CDL. At a later stage, however, one squadron joined the 79th Armored Division and by protecting the bridges and ferries from floating mines and saboteurs played a very useful rôle in the Rhine and Elbe crossings.

The CDL has never been used in a mobile rôle against the enemy, although had the special CDL tanks been available, definite opportunities for their use were presented in a number of operations. Research and development of the idea will continue, for any form of artificial illumination which can assist armor in keeping its direction and in producing aimed fire by night will surely plan a part in future wars.

*British Information Service.

BRIEF FOR A CAVALRY COMBAT PLATOON

by Captain Stuart J. Seborer

DURING 11 months of combat in 4 ETO campaigns, our cavalry reconnaissance troop participated in only two periods of breakthrough—at St. Lo and again after the Rhine River crossing. Breakthrough operations in which the troop received a number of straight reconnaissance missions were rare. On all other occasions it was called upon to perform any mission from attacking a town to holding a sector on the Siegfried line.

"Reconnaissance" was a misnomer from the troop's point of view. We were really cavalry *combat* troops and, unfortunately, not organizationally conceived with that in mind. It was with a feeling of insecurity that the troop frequently received orders to attack dismounted (with our radio operators, drivers, and 37mm gunners) in improvised infantry fashion.

An occasional field expedient was to attach a platoon of doughboys to the troop. This helped immeasurably, but it also revealed that the troop lacked organic riflemen to perform the type of missions usually assigned to it.

The solution lies either in restricting the type of mission to be given cavalry troops, or in changing the organization so that it is better prepared to accomplish a job of average difficulty. Experience proved that the latter is more realistic, because few higher commanders can afford to hold cavalry troops for specialized missions only.

The platoon is the basic tactical unit in our army organization. Combat showed that the platoon leader usually required a squad or two of doughboys to work efficiently through towns and woods. In defensive positions, the riflemen were needed for security and patrolling. With this in mind, the following is proposed:

CAVALRY COMBAT PLATOON (PROPOSED)

		Personnel
3 x ¼-ton Trucks	1 Officer	11 Enlisted Men
2 x Armored Cars		8 Enlisted Men
2 x Personnel Carriers ..		20 Enlisted Men
Total	1 Officer	39 Enlisted Men

PRESENT CAVALRY RECONNAISSANCE PLATOON

		Personnel
6 x ¼-ton Trucks		18 Enlisted Men
3 x Armored Cars	1 Officer	11 Enlisted Men
Total	1 Officer	29 Enlisted Men

The advantages of the proposed organization are:

1. *Economy of vehicles.* The platoon would have 7 vehicles instead of 9. Experience showed that frequently the fight to advance becomes a fight for roads. Nine vehicles will stretch out about 500 yards along a roadway and if tanks or assault guns are attached, the column becomes longer and even less wieldy. Since the firepower of rear vehicles can seldom be employed, the reduction in vehicles is a definite advantage in making the platoon more compact, more easily camouflaged in the vehicle park, and will also save in maintenance.

2. *Control.* Under enemy fire it is difficult to form the men from several vehicles into dismounted teams. It is time-consuming and inefficient despite training and standard operating procedures. In the proposed set-up, a team which rides together in a personnel carrier for dismounted action is a part of each cavalry combat section. The importance of a vehicular team can hardly be over-emphasized.

3. *Tactical Employment.* A dismounted-mounted platoon team will be of inestimable value for the missions cavalry has been assigned. Its vehicles also are present for performing any mounted reconnaissance mission, for example: the ¼-ton as a point covered by another ¼-ton, or armored car; or the armored car as point covered by the other armored car. (One of our platoons used the latter formation from the breakthrough at St. Lo until we reached the Elbe River.)

4. *Security.* An organic squad of dismounted riflemen and BAR team in each personnel carrier would give the cavalry combat section the security it needs when in contact with the enemy. The mission of outposting a town or fortified position also would be simplified.

The proposed cavalry combat platoon provides the platoon leader with the needed organic riflemen. The practice of attaching doughboys from other units, or even establishing a rifle troop within the squadron, is not an adequate solution to this fundamental organizational problem. The basic tactical unit must have these men as a permanent part of its organization in order to accomplish the missions usually assigned to it.

Mobile Patrol Troops Stalled Four Weeks By Lack of Gas

From Stars and Stripes, January 7, 1946

by William Jordy, Staff Writer

PROPOSALS to concentrate military might in a scattering of highly-mobile Army units for the purpose of occupying the U. S. Zone of Germany may collapse for lack of gasoline, if the immobilized Troop B, 25th Mechanized Cavalry Reconnaissance of the 4th Armd. Div. is a sample of the plan in action.

Charged with patrolling approximately 80 square miles of the mountainous landkreis of Regen and Grafenau bordering on the Czechoslovakian frontier, this unit has not sent out a patrol within the past four weeks.

While half-tracks and armored cars sit in a snow-covered motor pool, the cavalrymen fill in their idleness by patrolling Zwiesel on foot, to make this tiny mountain hamlet perhaps one of the most heavily-guarded areas in the ET. The remainder of their territory goes without protection.

The same situation prevails in other "highly mobile" patrolling outfits in this area.

Protection is badly needed here, Troop Commander Lt. Thomas Jamison of Pasadena, Calif., believes, since a recent shakedown in Zwiesel netted one SS escapee, 49 persons without passes on their persons and a considerable number of curfew violations. While the misdemeanors, with the exception of the escapee, were minor, they did indicate, the lieutenant asserted, that the people were getting careless and that an occasional show of force was good psychology.

Many Violations Reported

The troop has heard of numerous such violations in the near-by town of Regen, together with threats made by German youths against certain girls who went with U. S. troops. But there is no gas to make the 11-mile trip for the shakedown.

The only other soldiers in the two landkreis "protected" by Troop B are those in two eight-man MG detachments in Zwiesel and Grafenau, a Signal Company sent to Grafenau without arms, and a scattering of GIs and officers in a few plants now under Third Army control. Troop A, whose gasoline shortage is similar to that of Troop B, is assigned to border patrol in the area.

If attacks were made on these weakly armed outfits, Lt. Jamison said, they would be wasting their time to telephone to Zwiesel for assistance.

"Of course," he added, "we might be able to hitch a ride on civilian transportation."

There is some arrangement whereby a truckload of gasoline could be rushed from 4th Armd. Div. Headquarters in Regensburg, 80 miles away, in the event of an emergency. S/Sgt. Thomas W. Carnall of Mansfield, Mo. estimates that it would take a half hour to an hour of towing before the frozen, multi-geared armored cars and half-tracks could be turned over, even with tanks full of gasoline.

Idle Cars: Frozen Batteries

Sgt. Carnall said that each of his vehicles should be run for a half hour daily. As a result of our weeks of idleness, seven batteries have already frozen, along with bone-dry fuel lines and gas tanks.

"Actually," he said, "we don't know whether these vehicles would run or not. You never know what's wrong with them, unless you can run the motors every day."

Of the 44 vehicles carried as T/O equipment by this organization, only four were operating when a reporter visited the troop. These—two six-bys and two peeps—are used solely for troop administration. The remaining vehicles are so dry that when Lt. Jamison requested Sgt. Carnall recently to line up the motor pool, the sergeant was unable to budge the rolling stock the one or two feet required to do the job.

Lt. Jamison asserts that 1,750 gallons are needed to fill his tanks, plus an additional 750 gallons for a week's operation.

At present the troop receives an allotment of 240 gallons of gasoline weekly. According to 1/Sgt. John Marker of Mansfield, Ohio, the troop breakdown allows 140 gallons for cooking, 50 gallons to operate a six-by to Cham, 48 miles away, for rations three times weekly and 50 gallons for a peep making a daily trip for mail and other errands.

When a near-by MG detachment borrowed a five-gallon can of gasoline from the troop one day last week, the troop ate a cold breakfast the following morning.

Troop B is hopefully looking forward to receiving horses.

MULES FOR CHINA*

by Captain John A. Rand, F.A.

A description of the difficulties that were encountered when 900 mules were herded 750 miles from Burma into China, with recommendations by the author as to how some of the mistakes that were made could have been avoided.

HOW would you like to be given the task of herding 900 mules on a 750-mile trip? Such a task was assigned and performed. The time—May 26, 1945; the route—Myitkyina, Burma, to Kunming, China; the purpose—to provide mules for Chinese artillery units. The movement was initiated by China, and the Northern Area Combat Command at Myitkyina was in charge of preparations.

The mules chosen were largely from the 612th and 613th Field Artillery Battalions; the remainder were selected from other elements of the Mars Task Force. All the mules had been through combat in North or Central Burma campaigns.

Personnel included two officers and sixty-two enlisted men then on duty with mules in Myitkyina, plus six officers and 130 enlisted men flown from Kunming to Myitkyina for this mission. In addition, twenty-five enlisted men were detailed from the 13th Medical Battalion. This made a total initial strength of 240 officers and men.

Preparations were hasty, as we were given the first alert on May 15th. All mules had to be shod; equipment had to be drawn and fitted, and personnel organized for the movement by May 24th. The animals were broken down into three serials of 300 each, to travel one day apart. About six officers and enlisted men were reserved for overhead supply and administration; remaining personnel was divided equally among the three serials. Each serial had one veterinary officer and three enlisted veterinary technicians; one medical officer, and two enlisted medical technicians.

The first serial left Myitkyina on May 26th, the second on May 27th, and the third of May 29th. Taking the Myitkyina-Tengchung cutoff, they crossed the China border on June 2nd, 3rd, and 4th, respectively. One day's march from there, at Kuyung, we laid over three days to catch up on shoeing, which had been impossible in the difficult mountain bivouacs we had been through, and to reconnoiter the Tengchung-Paoshan cutoff. This latter proved not to be feasible, as the bridge over the Salween River on that trail was far too high and narrow, and very unstable. Therefore we proceeded through Tengchung to Lungling and the Burma Road.

The first elements reached Kunming on July 28th, the total distance covered being approximately 750 miles. Our total marching days were forty-seven; average distance per marching day, sixteen miles.

The second serial waited at Tsuyung seven additional days to allow the first serial time for re-shoeing and veterinary processing at FATC, Kunming, before proceeding east for issue to the Chinese. When the second serial reached Kilo 51, on July 30th, transportation had broken down to the east and all serials were held in place indefinitely. The third serial never left Tsuyung.

During this delay, surra, a communicable blood disease, broke out among the mules. Veterinary personnel of CCC, SOS, and FATC collaborated in a program of testing and isolation, and it was hoped that a new drug then being developed in the United States could be procured. At this point the war ended and the problem became one of disposition of the animals to Chinese SOS. It was decided, about September 1st, to destroy all infected animals, and this was accomplished immediately. Those first serial animals which showed a negative test were distributed to Chinese Pack Artillery Battalions in training at FATC, Kunming. About September 6th, on the advice of competent veterinary officers, the Commanding General, SOS, USF, CT, decided that the remaining animals of the second and third serials should be destroyed. This was a wise decision which undoubtedly prevented a wide spread of the disease.

During the entire trip the weather was inclement, loss of feed through spoilage was often as high as 50 per cent, and marching conditions on the Burma Road were hard, necessitating constant re-shoeing and corrective hoof treatment. In the early part of the trip evacuation of animals was next to impossible.

For the first forty days the entire command lived on 10-in-1 and mountain rations. After twenty-five days I obtained some Class B funds, and was able to buy eggs occasionally. It was also necessary to buy wood for cooking and for boiling water. Shortly before reaching Yunnanyi we drew B rations, and at Yunnanyi we were given partial pay and PX rations for the first time in approximately forty-five days.

Medical evacuation was difficult, and many of the

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men at the outset and during the trip suffered from chronic dysentery and fevers of unknown origin. Three cases of scrub typhus occurred, and many evacuations were necessary, but there were no fatalities. Atabrine suppressive dosage was maintained, and drinking water was boiled throughout.

The men performed an extraordinarily arduous task, and are to be commended for their devotion to duty despite difficult supply problems, very hard work, and unfavorable weather and field conditions.

From personal observation and experience as officer in charge of this movement I would like to make the following recommendations in the event that such an operation should ever be contemplated in the future.

We were ordered by Headquarters in China to pack all but riding mules and load them fully throughout the trip. We made a strong objection to this, as we had not enough men to keep packsaddles properly adjusted, and I knew from personal experience that it would mean sore backs and unnecessary exhaustion for the mules, besides useless wear and tear on the saddles and a lot of extra work for the men. In the end we packed 500 mules as far as Paoshan and, in the meantime, I flew to Kunming and obtained authority to turn in 400 saddles and to draw three more trucks. Up to that point we were grossly understrength, and, as a result, skinned a good many backs and exhausted a good many men. From Paoshan on, our strength was just right, and the mules arrived at the end of the trip with clean, healthy backs. The following strength figures should be approximately correct for any future movement of this sort: If route or terrain precludes the daily use of vehicles, necessitating packing of equipment, rations, and forage, there should be two men for each three mules, and mules should be led. If trucks can be used, one man will suffice for each four mules, stripped, and mules should be loose-herded. With this method, for each 300 or 400 mules there should be three trucks and one light vehicle, and one additional truck for forage stocks not more than six days' march away. This provides adequately both for supply and for transportation of mess and horseshoeing personnel and equipment.

Until we reached Paoshan we fed Indian grain, which had suffered a large percentage of spoilage. From there on we fed native horse beans. Good quality long-forage not being available, grazing proved essential, and I think our determined effort to utilize all available grass made a great difference in the final condition of the animals. Yunnan province is made up largely of steep bare hills and rice fields, the latter taking up almost all fertile ground, and it was difficult to find decent grass. Nevertheless overnight bivouacs were chosen entirely with this in mind, and each stop afforded maximum grazing facilities unless this was wholly incompatible with reasonable marching distance or water requirements. Mules were grazed a minimum of three hours a day, loose. Graveyards afforded us more grass than any other kind of area and we therefore found it necessary to camp in them very often.

Maintenance of weight exceeded our highest expectation. At the end of the trip the average drop in weight was approximately 5 per cent, and many of the mules had gained. This may be attributed very largely to the great effort which was made to utilize grass areas.

I consider rate of march to be the next most important factor. Twenty-four miles was the longest day's march; seven miles, the shortest. Just one month out, several mules began to give out, and each day we would have to leave more men behind to bring in the stragglers. This grew to be an alarming condition. In one day we destroyed five mules which had succumbed from pure exhaustion. As the distances had not seemed too great, we decided it must be the pace, which had been six kilometers, or 3.7 miles per hour, so ordered a reduction to a maximum of five kilos, or 3.1 miles, per hour. Each serial commander was given a choice of three methods he might employ to decrease his pace by this amount. He could either march his animals more slowly; halt at the end of five kilos until the hour was up; or, best of all, halt whenever he saw a decent patch of grass along the road. These grazing halts would last from fifteen minutes to two hours, and, though we hit camp each day somewhat later from then on, the mules came in fresh and with a fair amount of extra feed inside them. This is another argument for not loading animals on a march like this. At any spot we could stop and let the mules go immediately to rolling and grazing, unhampered by loads, which would have deprived them of the rest for which the halts were intended.

The other very important factor I would like to point out is provision of suitable animal evacuation facilities. There should be a Veterinary Section camped about every 200 miles, and a number of stock trucks, approximately one per 300 mules, to work between the animal columns and the Veterinary detachments. This was not provided for on our trip, and for quite a long time we could do nothing but shoot any animal which could not immediately continue the march, when a week's rest and treatment would have put him back on the road. These trucks would also be of great help in following the animals from day to day to pick up any that were weak or mildly sick, and thus save them that day's march.

We had an adequate number of horseshoers (about one per 75 mules) and transported them each day by truck so that the minute the mules hit camp the men were fresh and could start right in shoeing. Only by this means could they keep up with the situation. It is interesting to note that we carried along over two tons of shoes, and they barely lasted the trip.

Adequate time should be allowed to prepare for such a move as this. We had less than 10 days to shoe all the mules, draw a lot of equipment, and organize personnel. The last two planeloads of men arrived the night before the trip began. As a result of this time shortage we hit the road just about half-prepared.

The Use of Radar in Ground Combat

BEFORE the end of the war, Signal Corps developments in radar had made possible the long-range plotting of enemy mortar and artillery positions and the detection at night of moving troops and vehicles on enemy-held roads.

Accurate spotting of enemy gun positions at ranges of more than 5 miles was accomplished through radar detection of artillery and mortar projectiles in flight. This was made possible by the use of a specially adapted Signal Corps radar to obtain accurate oscilloscope bearings on both the upward and downward paths of an enemy projectile. From these bearings, the entire trajectory of the shell was plotted and extended geometrically to indicate the exact location of the gun.

Extreme Accuracy

This type of radar had an accuracy of 20 yards in range and one-third of one degree in azimuth (direction), and could spot a hidden gun position 5 miles distant with an error of not more than 60 yards.

The radars used to detect enemy night traffic had the uncanny faculty of being able to track all moving objects in the area covered by the radar beam. These too were standard Signal Corps radars which had been especially adapted for this function.

When an ordinary radar "scans" a stretch of enemy-held road, it detects every object along that stretch of road, and the operators are unable to distinguish the enemy targets from trees, hills, and other features of the landscape. For this reason it was necessary to modify radar sets so that only moving objects would be registered.

This modification was based upon what physicists call the "Doppler effect," and because of it Signal Corps scientists knew that radar echoes would be reflected back at a different frequency from a moving object than from a stationary one. Radar was modified, therefore, to filter out echoes from stationary objects and present only data from moving objects.

With this modification, the radars could be operated much as they were in the tracking of enemy aircraft. Precise data on the range and direction of movement of the enemy vehicle were supplied by radar operators to artillery units, which used that data to aim their guns. The radar could also spot the burst of the shells in relation to the target and tell the artillerymen how to correct their aim.

Radar Ranges

Vehicular targets were detected by radar at ranges up to 16 miles, although 10 miles was the average maximum range. Individual troops were detected at ranges up to three miles, and the radar technicians became so proficient that they could estimate the number of enemy soldiers in a group and the type and speed of enemy vehicles.

Some astonishing results were obtained during the French and German campaigns. On one occasion radar data was used to inform an American patrol of the presence of a German patrol about 200 yards to their right, with the result that the enemy patrol was ambushed.

On another occasion, the radar picked up three self-propelled enemy guns which were moving forward. A battalion concentration dispersed them. At another time a convoy of 40 vehicles was picked up and artillery fire was placed on the area until all movement ceased.

During the month of February, 1945, 9 per cent of the total artillery missions fired by our forces in Germany were on targets located by radar.

Signal Corps scientists first learned that radar could detect shells in flight when they tested the first American radar in 1937. Studying the ability of the radar to automatically aim antiaircraft guns at target planes, they noticed that when the projectiles exploded near the targets they appeared as echoes on the oscilloscope.

Counter-Mortar Use

This fact was considered of only casual interest until the Italian campaign, when combat units reported that enemy mortars were causing more casualties than any other one type of weapon. The Army desperately needed a counter-mortar device, and the Signal Corps suggested radar as the answer to this problem.

Radar sets SCR-584 and AN/TPS-3 were first tested for this function. The SCR-584, an antiaircraft gun-laying set which had already proven very effective in the detection of enemy vehicles, afforded exceedingly accurate data on shell trajectories but was too big for practical front-line use. The Signal Corps turned then to its AN/TPS-3, a lightweight search radar which could be transported by plane or carried by troops to a front-line position. Equipment modifications were developed to make this set more suitable for counter-mortar use. A large tract of wasteland at Island Beach, New Jersey, was set aside for experimentation and testing of the new set (AN/TPQ-3).

Combat infantrymen with extensive mortar experience were detailed to coöperate in the tests and actual combat conditions were simulated as closely as possible. A squad of infantrymen was directed to simulate a mortar attack, with live ammunition. Orders were to select a position, fire one round, and then "move out on the double." The first time this routine was followed, their position was located by the radar within two minutes and counter-fire was directed with such accuracy that the first round landed within 20 yards of the mortar position.

The modification kit which changed the search radar to a counter-mortar radar was so designed that it could be installed or removed in a matter of minutes. Changes to the equipment included the separation of the console from the antenna to permit installation in a foxhole for the protection of the operator.

Mental Health in Military Life*

Nervous breakdowns in combat may amount to as much as ten per cent of total strength. This subject warrants study by every officer.

by Lieutenant Commander Philip Solomon, USNR

MENTAL health is more than the absence of mental disease. It includes such positive elements as self-confidence, alertness, resourcefulness under fire, enthusiasm, good humor, and, in military life especially, resistance to fear—courage. Both in weapons and in men, the best materials will be useless if improperly cared for and controlled. Mental health is as important in the functioning of men as cleanliness, lubrication, proper setting of fuses and fire control are in the functioning of guns. It should be recognized that mental hygiene is as vital as physical hygiene in military life.

In the following topics, various elements that enter into the production of mental health in troops will be discussed.

Proper Leadership

Millions of words have been written about leadership, and many articles and handbooks on the subject are available. It is not the aim in this discussion to summarize, condense or select from this wealth of material, and certainly not to compete with it. The techniques of military leadership are competently taught elsewhere. It is relevant, however, to stress here those aspects of leadership which have particular importance with respect to the NP problem.

Symbolically, the leader represents the father to the enlisted man. The American boy, in general, has been brought up in an atmosphere of family democracy. The successful American father exercises his authority with benevolence, combines firmness with good will, and attempts always to make the child understand the reasons for the orders and rules. The result is a properly balanced attitude toward authority that carries over from the father to the teacher, the teacher to the policeman and so on to employers, club leaders and government officials. Leaders are expected to lead fearlessly, but always in the interests of and with respect for those led.

The officer should always keep in mind this traditional American attitude toward authority. Naturally, in the military setting there are usually limits to the amount of explaining that may be done, and often obedience must be immediate and unquestioning. But the principle may hold nonetheless.

Two common and oppositely directed failings in officers are important in considering mental health of enlisted men. The first is the overbearing commanding officer, who mistakenly overemphasizes curtness, bluster and stern discipline. Such an officer stirs up deep-seated hostility and rebellion in many men. The second is the weak, indecisive officer who vacillates and falters in the pinches. Such an officer generates lack of confidence, apprehension and anxiety.

Either reaction is damaging to mental health and conducive to NP breakdown. The officer who cannot maintain an essentially paternal attitude toward his men may be a satisfactory figurehead but never a true leader. The American fighting man wants neither to be bulldozed nor mollycoddled. He wants only a square deal.

Proper Training

Self-confidence is the antidote to fear. The value of battle-hardened troops has long been appreciated by military leaders. But thorough training can be a good substitute for actual battle. Drills, combat courses, maneuvers, live ammo fire, simulated mines, mortar fire and amphibious landings can be made very much like the real thing. Adding amplified recordings of actual battle sounds would be of additional help. Certainly the field living—mud, lack of comforts, K rations, primitive heads—can be experienced in the form of a preexposure which will serve to prevent surprise, disgust and revulsion at a time when such emotions would be damaging in actual combat. Those who cannot take it are best weeded out in training. Every effort should be made to send troops into combat only after they have completed the entire course. Green men as replacements are often considered worse than none at all.

Strategic Orientation

The average American is a thinking being and not an automaton. When he is asked to leave his home and his loved ones to take up arms, he wants to know what he is fighting for. He cannot be expected to do his best unless he is convinced of the vital and inescapable urgency of the Cause. A thorough indoctrination in the causes for which we are fighting should be part of the early training of every man. Material of this general nature may be offered in the form of educational movies, but they should be supplemented by group discussions under capable directors, so that the individual man may ask questions and clear up doubts in his mind.

Tactical Orientation

Not only is it of value to have the individual understand the reasons for war: he should also be made to

*Condensed from article in *The Marine Corps Gazette.*

understand the reasons for the particular military operation in which he is scheduled to take part. Pains should be taken to give him as much information of the tactical situation, all the way down the line, as military security will permit. Probably the greatest advantage that American fighting men have over those of other nations is their aggressive resourcefulness under fire. The way to capitalize on this is to let every man know as much as possible of what is in the wind. Then, in an emergency, he will be better able to fend for himself and perhaps improvise a way out of his difficulty. He will also have greater confidence in himself when he knows that his leaders are willing to trust him.

Rewards

Men do things for many reasons. One of the most universal and most potent of reasons is the desire for reward. In military life, the judicious use of rewards can serve as a powerful agent toward the preservation of mental health.

Rewards may occur at various levels. Perhaps the highest is the reward which a man gives himself—the inner satisfaction of a job well done. This spiritual or philosophic level is the proper concern of the chaplain, and in military life its influence is great. The line officer enters a somewhat lower level. The valuable reward which he may distribute is a well-merited word of praise or appreciation. A sincerely spoken "Good Work!" from his commanding officer can raise a man's spirits for days. Equally important, though less frequently applicable, are letters of commendation, citations and decorations.

At a more material level, reward in the form of a promotion raises a man's ego, epitomizes progress, and what is more significant to many men, means more money. Contrariwise, the lack of promotions, or slow rate as compared with other branches of the service causes resentment and bad feeling.

Further on down the scale, furloughs and liberty time are highly treasured. Again, a liberal policy toward the deserving will pay dividends in greater efficiency, less disciplinary action and better mental health. Comfort items, such as those distributed by the Red Cross, movies, canteens, and the like, are greatly appreciated by the men. They should be made more readily available for the fighting men on their returns from the front, rather than the special prerogative of rear area troops as is all too often the case. This would decrease the hostile feelings held by front-line troops for those in the rear, and would help make them feel, as they should, that they are the cream of the crop.

Finally, at the end of the line, are punishments. Undoubtedly, the threat of punishment is a deterrent to wrongdoing for many men. But threats must not be overdone. Punishments, to be effective, should be swift, sure, scrupulously just, and meted out with full consideration for all attendant circumstances. It is noteworthy that those outfits with the best leaders generally have the fewest disciplinary actions. The desire for approval is far healthier than the fear of disapproval.

Proper classification and assignment.

An attempt is made to place every man in the job he is best fitted to do. Unfortunately there are serious limitations involved. There is need for only a certain number of clerks, carpenters and plumbers. On the other hand, large numbers of riflemen must be provided to do the actual fighting.

There has been bitter criticism that only the flower of our manpower is chosen for "cannon fodder," that the unfit, who could more easily be spared by the nation, are rejected. This is an ironical necessity of warfare. In this connection, attention should be drawn to the widespread error of underrating the requirements for first-class front-line troops. There has been too general a tendency to use "riflemen" as a dumping ground for the leftovers after other jobs have been filled. Every experienced line officer knows the enormous difference between skilled troops and a group of ineffectuals.

Unquestionably, there would be fewer NP crack-ups in combat if the need for a well-integrated personality and mature emotional stability were recognized in combat troops. Just as candidates are screened before they come into the service, they should be screened again most carefully before they are sent into combat. The immature, the unstable, and the dull-witted, to mention but a few, should be kept in rear areas.

Men generally do best what they wish to do. Of course, the military needs must be considered first, and many men will feel they are misrouted. When this is true, their attitude will improve greatly if they are given the benefit of an explanation. They also should be made to realize the importance of routine, uninteresting jobs in war. It bucks a man up to think that what he is doing is important. It sometimes helps to explain to men the fundamental and necessary unfairness of war —the unequal distribution of risks, of awards, of inevitable waste.

Officers are sometimes troubled by the "8-ball," the man who is as helpful as a sore thumb. Such a man is often palmed off onto others as the simplest solution. On occasions this helps, since the man may just happen to find the particular niche where he can get along. More often the problem is aggravated. Misclassification or misassignment may be the cause, and it may be helpful to consult the classification officer. If this fails, the case should be referred to the medical officer, or psychiatrist.

Group Spirit

Man is a gregarious animal. He prefers to share both his pleasures and his dangers with other men.

Experienced officers are familiar with the value of team spirit. At its highest level it is called patriotism and constitutes a sustaining driving force in time of war. It is equally important at lower levels, in loyalty and devotion to the corps, division, regiment, battalion,

company, platoon, down to squad and tent-mate. A man will stand and fight for his buddy when he might run away by himself. The cohesive strength of the group, the knowledge that he is not alone in his trouble, will hold a man to his post when all hell breaks loose. This fact must be utilized to the limit in a military organization.

The same group of men should be kept together as much as possible, from their early training on into actual combat. Their pride in their outfits should be encouraged in every way. Officers should be sensitive to this group spirit, take part in it and exploit it to its fullest. When replacements are added to an outfit, they should quickly be indoctrinated into the feelings and traditions of the group.

Other Considerations

No man can be easy in his mind, or put his whole heart and soul in his work if he is worried about conditions at home. Every effort should be made to keep strong the one tie that still binds a man to his home—the mail, all conceivable priority should be given it. Up-to-date news, when it can be provided, is also a boon.

In cases of individual family problems a talk with his officer or the assistance of the Red Cross worker or chaplain may be of great value to the man in trouble.

Nothing is so conducive to high spirits and fresh energy on return to work as an interesting and vigorous sports program. But recreation does not stop at athletics. The movies, at which the soldier can forget himself and the war for a few hours, are a great source of entertainment in every theater of operations. Enlisted men's clubs, Red Cross activities, table tennis, bowling, libraries, game rooms, music, USO shows, hobbies and well-stocked PXs vary in applicability on the military situation, but each in its place can add tremendously to the happiness of the men.

Religion plays an important role in the life of the fighting man. Through religious services he can learn as in no other way the ultimate goals for which the war is being fought. A man also gains a feeling of security and confidence from prayer and his faith that he is not alone. Religion in the field is seldom generated by fear. Rather it is sincere, deep-seated, inspiring and a powerful source of mental health.

Religious observances also are of value as a continuation of accustomed civilian practices, they constitute a strong connecting tie with home and all that home signifies. It goes without saying that every effort should be made to permit men to attend religious services as regularly as possible.

A Fallacy

It is easy to fall into error when dealing with psychological matters. Psychologists themselves do it frequently. Military men would do well to keep their feet on the ground and avoid theoretical speculations in the matter of the mind.

Griping can serve as a healthy safety valve to let off steam. However, if griping reaches serious proportions, the officer would do well to investigate. A man-to-man talk with a few of the offenders may be an eye opener. Perhaps something is really amiss and needs to be set right. In any case, the men will enjoy the chance to get a load off their chests and in many instances will be able to face unavoidable annoyances more calmly afterwards.

Just this sort of attention on the part of officers for their men engenders fierce loyalty "when the chips are down."

Normal Reactions in Combat

Military combat is probably the most abnormal life situation to which large groups of human beings are forced to be subjected. The stresses are rarely duplicated, even in part, in normal living, and are never continued over such a prolonged period. Foremost is the ever-present danger of death or mutilation, the necessity to kill or maim the enemy, to destroy his stores and possessions, to live under conditions of physical hardship, overexertion, extreme fatigue, and often inadequate food, water, sleep or shelter.

A word should also be said regarding the truly remarkable powers of the human body to withstand such maltreatment as occurs in battle over prolonged periods. The ability of the body to adjust to the most trying of circumstances, the latent power and endurance which lie within it are always surprising when the crucial test arrives. When it seems as though exhaustion has reached its utmost, the stimulus of danger or extreme emotion may yet result in a supreme effort and a sudden resurgence of reserve strength.

Mental Health Required

Probably the best defense against combat fatigue is a high state of robust mental health. In actual practice, two regiments in the same division, undergoing the same degree of combat (as indicated by duration and number of killed and wounded in action) may suffer widely different numbers of combat fatigue casualties. The crucial determining factor is the morale of the men, and when the chips are down, morale depends more on good leadership than on anything else. It is the demoralized troops that break down in combat. "Demoralized" means loss of morale.

In any type of warfare, the amount of combat fatigue will depend to a considerable extent on the skill with which the specific causative factors of nervous disorder are avoided. Frequent rotation of troops in the front lines will result in great gains with respect to mental stability and efficiency. When the character of the operation makes this impossible, it still helps enormously if the men can be given some idea as to when their ordeal is likely to be over. The greatest emphasis on providing adequate food, water, and other supplies, including mail, is of course of utmost importance. And the leader must preserve an atmosphere of optimism and good cheer. Nothing demoralizes so much as defeatism.

German Science in the War*

by Colonel Leslie Simon, Ordnance Department

Condensed by Cpl. I. E. Segal from Part XII of "Report on German Scientific Establishments" *by Col. Leslie E. Simon, Director of the Ballistic Research Laboratory, Aberdeen Proving Ground, and based on information obtained by Colonel Simon on his tour of Germany during the Summer of 1945.*

IT is remarkable that with a very much smaller potential source of research and development personnel, the German government succeeded in maintaining a line of war weapons that were at least comparable to those of the Allies. Considering the changing conditions of warfare, and the period of time, that was a tremendous accomplishment. A few of the outstanding achievements were:

1. An extensive understanding and thorough utilization of hollow charges.
2. A good series of artillery rockets.
3. An understanding and utilization of solid- and liquid-fueled rockets and guided missiles.
4. The use of tungsten-carbide cores in projectiles.
5. Jet and turbo-jet engines.
6. Good anti-aircraft fire control, both optical and radar.
7. Low-velocity, large-caliber automatic cannon for aircraft.
8. Guns of excellent ballistics, particularly the 75mm high-velocity gun and the 88mm series.

With regard to what might have happened if the war had lasted somewhat longer, such a question is always subject to partially undecidable considerations, but some of the obvious threats were:

1. The "V" weapons. A survey of the status of these weapons indicates that they may have an important part in any war of the future, and that geographical remoteness may greatly decrease in or entirely lose its significance.
2. The flak rockets. The theoretical problem of guided missiles was solved, that of "homing missiles" practically solved, and the practical application well under way.
3. The 5.5cm aircraft rocket. This was a result of probability considerations, and only experimental production was in progress. It was stated that six ME262's (turbo-jet fighters), equipped with these rockets, shot down 14 fortresses in a single mission.
4. The P1102. A new very fast turbo-jet-engined Messerschmitt, with swept-back wings to reduce air resistance.
5. Long-range finned missiles shot from guns.
6. Short-range, long, finned projectiles of very great explosive capacity shot from conventional guns.
7. A super-rocket designed to go from Germany to New York in 30 minutes and which carried a pilot for part of the way.
8. Aircraft with the speed of sound.

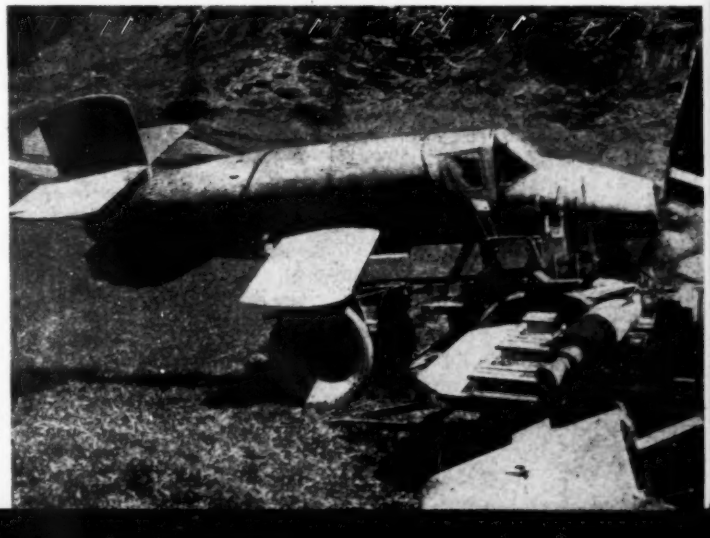
Both psychologically and materially, Germany was well prepared for a sound organization of war research. The German people were marked by a high degree of intellectual self-esteem; they felt that they were an industrious and intellectually proficient race, and that each and every one of them was in a favored position to contribute to scientific effort. In addition to this attitude, which had encouraged a supply of scientists, the Germans had excellent instruments and mechanical work, for which they are noted.

The German attitude of mind was one which invited organization in every phase of life. There was no antipathy to regimentation, and a great respect for constituted authority. Even people whom one might expect to be liberals, such as the scientists, were well-disciplined. Therefore, there was confidence in science, a desire for more and better science, and a willingness to accept an authoritative organization of science.

The official attitude of the Government was less evident. Surely it was not one of opposition to research, for it accepted and financed too much of it for that to be true. On the other hand, it is also evident that there was no definite policy for its exploitation. The explanation appears to be that the government was the officials who administered it, and some were intelligent and some were not.

There existed in Germany the idea of the "master race" by virtue of which it was felt that they should have markedly superior weapons; miracle weapons were hoped for. There was the German weakness for the spectacular—the influence that led to the Paris gun, in

Rocket-propelled "Viper" was a combination interceptor plane and guided missile. It had a "pilot-ejector" and was launched vertically from a tower.



*Firepower.

World War I, which certainly could not have been expected to affect the military outcome—which was undoubtedly a large part of the motivation of the "V" weapons. In short, relative to the exploitation and organization of war research, the Government was willing but not intelligent.

Nearly all German research during World War II was war research. In order to procure supplies or apparatus, a war necessity had to be shown. In the interest of survival, research agencies sought in every way to connect themselves with the armed services, and exploited every avenue of contact, considering it unsafe not to advance their war-necessity status. As a result, research agencies tended to become enmeshed in a complicated net of contracts and affiliations. But research was regarded as the chief means of devising new weapons which would be sufficiently powerful to enable Germany to escape defeat by enemies who were superior both in numbers and in equipment.

Despite the fact that most research agencies were serving several offices, that the various offices exercised varying degrees of control over a number of agencies, and that each research problem was often of interest to a group of offices, the general character of research organization was not extremely complicated. In fact, this overlapping of functions, controls, and interests may not have been harmful. The end product of research is itself so uncertain, and new knowledge is potentially of interest in connection with so many fields, that more rigorously defined avenues of responsibility and authority might have retarded the dissemination of information (which was already considerably hampered by security regulations) and the exchange of scientific information.

The German Air Force had not only the most extensive research facilities, but also by far the most effective and competent organization and personnel. The extensiveness of its research facilities may be partly accounted for by the fact that the Air Force was an agency predicated on new things, and it felt a great affinity for and confidence in the new. On the other hand, the competence of its research and the quality of its personnel are probably attributable to the conditions of research which it fostered. It was hampered by neither an old organization nor a tradition. It built a series of modern research establishments to which it gave exceptional autonomy, and which reported freely and directly to the Air Ministry. In addition to these establishments of its own, it also exploited the academic institutions and the research establishments of the great industrial firms.

The German Army, however, had only a single quasi-military research agency of its own. Like the Air Force, it had contracts for facilities of the academic institutions and firms. Its research was all reported through an office only coördinate with the offices of the development divisions. But the real control of its research and development was in the hands of the manufacturing firms. Likewise, it appeared from any brief investigation that weapons of the German Navy were extremely dependent upon the great manufacturing firms.

The organization of German Air Force research, which was very largely due to one man, Baeumker, incorporated fundamental principles known to men of science but seldom seen in practice outside a few laboratories. The research unit was not too large (perhaps 50 to 100 men) and the research structure was based on the institute. Unscientific interference into the institute was avoided by having it report only to the highest authority for some loosely held powers of coördination and administration which were delegated to intermediate authority.

The importance of congenial social status and comfortable living conditions to the successful and vigorous conduct of research was recognized. Scientists were accorded a place of distinction; it was made possible for them to live in groups; their research buildings were spacious, dignified, well-furnished, and pleasantly situated. Finally, the salaries of the scientists were high, by German standards, though not as high as industrial salaries. It was manifest that these conditions could not fail to have a beneficial influence on the quality and quantity of scientific output, not from the viewpoint of pampering the scientist but from the purely materialistic viewpoint of removing interferences and irritants that would decrease or stultify the flow of ideas.

There were also psychological and physical factors that inhibited the successful functioning of the German scientific organization. There seems to be a sort of idiosyncrasy of the German mind that may be a compensation for its meticulous methodology and studied efficiency. It might be called "susceptibility to error." It is characterized by a carefully laid plan, worked out with infinite detail, except for one vital and missing part. Having done so much so well, the Germans often made a simple mistake which was ruinous to the total effect.

The major error in the conduct of German scientific war research was a case of just one vital and logically obvious element left out of a perfectly magnificent scheme; and both the military and the scientists were partly responsible for it, although the major responsibility rested with the scientists. The major error was simply this: the scientists tried to do research to fill a need when demand was made by the military or specifically by a ministry.

It is somewhat natural for the scientist who is rather separated from military planning to say: "I know my science; tell me what you want, and I will try to get it." However, anyone who is familiar with research knows that it simply cannot be done that way, except rarely. Research takes time.

In summary it may be said that science succeeded in almost everything scientific, acquired a magnificent research organization, produced much that was useful, and failed miserably on a directive feature that would have made its work many times more powerful.

The Soviet Art of War*

THE war between the Soviet Union and Germany ended in a defeat for the enemy greater than any known to history.

The chief events of the war, including the decisive battles of 1944-1945, took place on Soviet soil. The German supreme command constantly stressed the paramount importance of the Eastern Front, and on several occasions transferred troops there from the West.

The Soviet success in the struggle against all the might of Germany's war machine is explained in a considerable degree by our superior theory and art of war.

The highest degree of skill was attained by the Red Army and its commanders during the war, for they constantly analyzed and learned from their rich experience. It must be strongly emphasized, however, that the fundamental principles and the theory of tactics were developed, long before the war began, on the basis of study of the First World War, the Civil War of 1918-1920 and other wars which took place between the First and Second World Wars.

There is no doubt that the early successes achieved by the Nazi armies in the war against the Soviet Union are only to be explained by the temporary superiority which Germany secured by her treacherous and sudden attack on the USSR.

The USSR was able to overcome the difficulties of the first period of war and assume the offensive for the final defeat of the enemy because she depended not only on her tremendous reserves of manpower but to an even greater extent on huge quantities of armaments, first-class in quality, which the industries of the Soviet Union supplied to their Red Army.

The Soviet art of war, the war doctrine of the Red Army, was built up under the direct guidance of such brilliant authorities as Lenin, Stalin, M. Frunze, one of the greatest of the Red Army's early generals, and others. Generalissimo Stalin directed the most important operations of the Civil War and stood at the head of the armed forces of the USSR during the Second World War.

The main theses on which the Soviet art of war is built up, the methods of conducting operations, types of maneuvers, activities in the main direction by large striking forces, the maintenance of supplies for operation, the building up and employment of reserves, and many other points were laid down by Stalin in a number of his prewar works based on a brilliant analysis of the experiences of the Civil War and First World War.

These theses, which were extensively employed by Stalin with such good results during the Civil War, formed the basis of *Red Army Regulations (1936)* and have not yet become obsolete. The main point in these regulations covers most of the typical features of modern warfare--operations in great depth, the growing importance of artillery, tanks and aircraft, and methods of employing them.

The regulations, correctly assessing the growing strength of modern defenses, lay special stress on the importance of effecting a breach in strong previously built defenses, in depth. No less important are the offensive operations planned in the regulations for definite objective operations employing movement and complete encirclement of the enemy.

It will be remembered that many of these Red Army regulations were used in their entirety by the Germans for their own rules and regulations (especially on the use of tanks and airborne troops), and, also, by the Japanese who in the last edition of their field regulations copied a number of points of the *Red Army Regulations (1936)* almost word for word.

The Red Army made a thorough study of the experiences of the past, but studied them from a creative viewpoint, taking into consideration constant changes in technical equipment, and tried, as far as possible, to foresee the characteristic features of the future war.

From the standpoint of theoretical knowledge and training of regular officers, the Red Army was not taken unawares by the Second World War. From the very outset it did not meet with anything that was staggeringly new or unexpected. The Germans, despite the treachery and suddenness of their attack, did not surprise Soviet troops with anything new in the way of operations or tactical methods. On the contrary, the methods used by the German staff were extremely stereotyped on the whole.

The Soviet war against the German aggressor developed on a scale unknown in history, both from the viewpoint of the number of men and machines participating and from the viewpoint of the problems that the Red Army had to solve for the purpose of speedily defeating and destroying the enemy's fighting forces. In view of this the Soviet Command reviewed while the war was in progress a number of these from the *Regulations* concerning the conduct of operations under new conditions.

These were such items as: the planning and conduct of simultaneous operations on a wide front embracing groups of armies and several fronts for the purpose of defeating the enemy's main strategic forces; questions of conduct of continuous offensive operations to a depth of 250 to 300 miles without a lull or a halt; and questions of organization of maneuvers to surround enemy forces, which was only fully developed during the Second World War and became the Red Army's chief method of conducting offensive operations. The problem of frontal attack was extensively developed.

From a narrow use of maneuver to force a breach only in the enemy's tactical depth, the Red Army progressed to the striking of such frontal blows as would split the enemy's operative defenses to a depth of anything up to 300 miles.

The question of the use of artillery was very widely developed, as well as that of employment of tanks and aircraft in modern battles; and the use and cooperation of all branches of the armed forces in depth in defensive and offensive operations.

*By Major General Nikolai Zamyatin, *Soviet Information Bulletin.*

Artillery Offensive*

by Engineer Colonel Pavel Zverev

IN the years preceding the Second World War, military minds were as much occupied with the problem of a break-through of fortifications as with the mass employment of tanks and aircraft. This was dictated by the experiences of the First World War and the tendency to build such powerful fortified areas to protect borders as the Maginot, Siegfried and Mannerheim Lines. In addition, the development of fortifications showed that the construction of field defenses would also be based on the principle of many-lined fortified areas.

These forecasts were confirmed in the majority of Red Army offensive operations during 1942-1945, which invariably began with a break-through of the German defenses. It should also be borne in mind that the farther the Germans were forced westward, the stronger their resistance became. But now that the powerful East Prussian defenses have been shattered, the dozens of fortifications situated between the Oder and Berlin have been overcome by Soviet forces, and under the blows of Allied armies the Siegfried Line collapsed, we may draw the indisputable conclusion that the problem of blasting fortified zones has been solved.

Considering the experience of the Red Army, we may assert that this solution was reached in a new way by the artillery offensive.

There are examples in the First World War where the concentration of artillery was not far below the average of this war. But there can be no comparison in the results achieved in the First and Second World Wars. In those days with the pounding of the enemy's defense zone continuing for days, the break-through operation was protracted and therefore did not yield the desired result, whereas now, as displayed by the Red Army artillery, the preparation continued for no more than 90 minutes or two hours, but the quality of fire was so highly superior that tanks and infantry negotiated the main defense lines in a single day. This was achieved not only by an increasing density of fire, but also by a skillful conduct of barrage—a tactic in which Soviet gunners have reached perfection.

In spite of the fact that in a majority of cases the number of Soviet artillery regiments on the sector of the break-through highly exceeded the number of infantry regiments, the artillery never hindered the operations of the infantry. On the contrary, its fire was completely subordinated to the objectives of the infantry.

Artillery offensive was composed of three main periods: artillery preparation, creeping barrage, and shifting fire deep into the enemy's defense zone.

The first stage is the most intensive, for it engages all the guns in a simultaneous action on the sector of the proposed break-through

An original interesting example of the organization of artillery preparation was provided by the Army of the First Ukrainian Front when German fortifications on the Vistula south of Sandomierz were blasted in January 1945. The main feature was that as a preliminary to the offensive, a short sham artillery preparation was started with only one-tenth of the available guns in action, and a feint attack was begun by a few battalions. The Germans mistook this for the real thing, bringing in all the forces at their command, and the attack was easily repulsed.

But soon the Soviet artillery, 250 pieces for every kilometer of the front, began again to pound the enemy. The barrage went on for over 90 minutes and was so effective that Soviet tanks and infantry made a wide gap in the entire depth of the enemy's defense zone.

Referring to this battle, Colonel Schtresner wrote in his diary: "The Russian artillery fired with amazing precision. In a matter of 15 minutes, communication was completely disrupted. I could not raise my head at the CP. It was quite impossible to direct the operations of the regiment. All my units sustained heavy casualties from gunfire. Those who survived, scattered."

It would be a mistake, however, to think that this was the only method used during the preliminary bombardment. There were hundreds of variations.

But no matter how effective the preparatory barrage may be, there always remain enemy firing points capable of inflicting heavy casualties on the attacking force, or even of checking the advance. For this reason the importance of artillery fire becomes even more significant when the attack is finally launched. If during the period of preparation the fire of each gun is directed to a certain target, then with the attack in progress the batteries can move their fire in strict coördination with the movement of the infantry and tanks.

The change of depth of fire is accomplished either by concentrated action or by setting up a barrage, or by combining the two. But whatever the method employed, Soviet infantry and tanks always moved just ahead of the creeping barrage and crushed every resistance. This wall of fire accompanied the troops for approximately 700 to 1,000 meters from the enemy front-line defenses and continued for about 30 minutes. That brought the second stage of the artillery offensive to an end, and then followed the third period.

This division of the artillery offensive into periods is theoretical, of course, for artillery fire was constant. While the wall of fire was being shifted from the first to the second trench, regimental and antitank guns had already begun to move forward and, following in the ranks of the infantry and firing direct, they silenced

*Courtesy *Information Bulletin*, Embassy, U.S.S.R.

the surviving firing posts, knocked out counterattacking tanks or infantry parties of the enemy. Immediately afterward divisional artillery went into action.

Under this method of organization, the Soviet infantry always had the support of the artillery. Every enemy attempt to counterattack was frustrated by the concentrated fire of the divisional and corps artillery.

At the beginning of an offensive the artillery pounded the enemy defense zone to a depth of 8 or 10 kilometers, but with the advance of the infantry the fire zone naturally diminished, while the number of guns in action remained unchanged. This enabled the attacking force to deal ever stronger artillery blows and retain the superiority of fire power.

The long range of the corps and Army artillery groups, the mobility of the regimental and divisional guns, enabled the gunners to concentrate fire on the entire tactical depth of the enemy's defense zone. This paralyzed resistance, and thus solved the problem of successfully blasting a fortified zone.

Proximity Fuze Played Vital Role in Defeat of Axis

CHRISTMAS DAY, 1944, had been selected as the date for the first presentation to the enemy of the VT radio proximity fuze, but when the Germans launched the Ardennes offensive plans were immediately changed and the fuzes were committed to battle.

U. S. artillery projectiles, fitted with the pint-sized fuzes which caused the projectile to explode when it was within 70 feet of its target, helped halt Von Rundstedt's offensive. It vastly multiplied the lethal effect of interdictory and harassing artillery fire, and was considered secondary in importance only to the Atomic Bomb.

Use In Rockets

The VT fuze also was employed in the Army's airborne 4½-inch rocket. Extensive tests demonstrated that one out of two VT-fuzed rockets, fired from a fighter plane, could be counted upon to bring down an enemy airplane at ranges up to 1,000 yards. Since the usual fighter plane normally carried six 4½-inch rockets, this meant that a single plane would be able to account for three enemy planes on each mission.

Another use of the VT-fuzed rockets was upon gun emplacements, enemy personnel in foxholes, or airplanes parked in revetments. Tests showed a twenty-fold increase in the number of casualties for the VT, as compared with the results obtained from a rocket which was fuzed to detonate on contact with the ground. Rockets equipped with the VT fuze detonated just above the target, and blanketed the immediate area with a hail of high velocity fragments.

Mass Production

Mass production of the fuzes for airborne rockets was started in the summer of 1942, and by the middle of 1943 nearly a million had been stored for use in the event the enemy ever again threatened to regain control of the air.

Sufficient fuzes had been manufactured for their employment in combat by January 1, 1944, but their general use was temporarily withheld in deference to the safety of Allied aircraft.

The high degree of secrecy which the VT project called for made it necessary to avoid the normal channels of supply. It was therefore necessary to transport great stocks of the fuzes to isolated and well-camouflaged depots in the British Isles, France, Italy and to bases in the Pacific.

Training of Personnel

After the problems of supply had been solved, it next was necessary to indoctrinate artillery personnel with the peculiarities of VT. A detachment of technically qualified officers and men were trained in VT development laboratories, and then sent to theaters of operations throughout the world. Nearly 200 of these newly trained specialists went to Europe and the Pacific.

The first of such teams embarked for England in March, 1944. Its mission was to aid theater personnel in maintaining security, to expedite the movement of supplies, and to indoctrinate ordnance and artillery personnel in the technical nature of the fuze.

Both U. S. and British Army personnel were taught to shoot VT-fuzed shells in such a way that maximum effectiveness would be obtained. The results now are well known. The destructiveness of antiaircraft fire was increased at least five-fold. London was saved.

Universal Military Training*

by Colonel W. A. Graham, Retired

TWICE during a generation the power of the United States has tipped the scales in global war. Each time—by lucky circumstances—we have been afforded time to marshal our enormous strength for battle.

This breathing spell cannot reasonably be hoped for should World War III ever break out. Modern war has sharply increased the length of time needed for preparation. In World War I, 17 months elapsed between the declaration of war and the first major U.S. offensive. There were 30 months between the sneak attack on Pearl Harbor and D Day.

The one and only sound argument against universal military training would be to demonstrate convincingly that the national security does not require it. If the United States could always be sure of enough time to enact the necessary legislation and to train and equip an army for the field, there would be no need of such a program. The ever-growing threat of amphibian operations and of long-range air attack, however, has made it almost certain that the next powerful aggressor against world peace will strike at us first—if we are unprepared.

The argument that volunteers will suffice has been proven false. Experience shows that, for various reasons, the great majority of eligible men will not enlist, and the patriotic and adventurous who do have never exceeded more than 12 per cent of our military needs. In World War II nearly 14,000,000 Americans were required for the armed forces.

Many opponents of universal military training have claimed that it will endanger the ideals of democracy. What is meant by this rather vague assertion is not clear, unless it be that submission to military discipline for a year might tend to weaken individual initiative. Was this true in the North and South after 4 years of civil war? Did the 4,000,000 men of 1917-18 lose their democratic ideals? Have the 14,000,000 who bore arms in World War II lost their individual initiative? These questions are best answered by the veteran's support of a program for universal military training.

The conclusion that military training would inculcate the so-called martial spirit in the United States does not appear to be justified. Many school boys are compelled to take courses in manual training but the schools cannot be accused of fostering an army of carpenters.

Certain educators have voiced a protest against the inevitable interruption of school and college life. Granting that some such interruption would occur, one short year seems a small contribution to the cause of national security when loss of life, of family, of home, and even of country, may be the price of unpreparedness. It is the duty of every man to provide for the common defense of his country.

The need for a universal military program is as old as the Republic itself. It was evident in Washington's day, when he said: "If we desire to secure peace it must be known that we are at all times ready for war." It was even more obvious in the last days of Franklin D. Roosevelt, when on the eve of the San Francisco conference, he said: "Universal military training is requisite to our national security."

In 1792 the Congress wholeheartedly endorsed compulsory military training. It was, however, imposed on all men between the ages of 18 and 45, rather than only on those youths who met the physical requirements. The enforced absences of the older men from their various employments would have disrupted the economy of the nation, but the old Militia system served to demonstrate that the principle of universal military training was an integral part of the initial policy of the United States to distribute fairly the obligations of national security.

In enacting such an all-inclusive measure, the Congress had set its judgment against that of every military expert in the country—including such men as Washington, Steuben, Knox, and Hamilton.

In 1783 Washington had submitted to the Continental Congress his "Sentiments on a Peace Establishment," together with the views of many of his generals. While recommending that all members of the Militia be enrolled, he laid especial emphasis on training "only the youth and younger men." To accomplish this he recommended the formation of what he termed the "select corps" which would be chosen from the then existing regiments of Militia. In time of national emergency these would be merged to form a trained and disciplined force, ready and equipped for immediate action. The great body of the Militia, consisting of the older men, would be held in reserve, and called up as a last resort.

Both the Regular Army and the National Guard (which in 1903 supplanted the old-time Militia) normally depend upon voluntary enlistments to fill their ranks. This system, because of its prevalence in our wars before 1917, has come to be regarded erroneously as America's "traditional system" of raising her armies. It was not the system of the founding fathers, as has been shown.

It should be emphasized that the word *conscription* to describe compulsory training is both misleading and inaccurate. Conscription is forced military service. The word has never been employed in any other sense. *Military service* means active duty in the Army or Navy, subject to the orders of commanding officers to move against an enemy.

On the contrary, *military training* means that the

*Digest of a pamphlet prepared by Colonel Graham.

men who undergo it will be instructed as pupils, not employed as practitioners of the military art.

They will not constitute a "huge peacetime Army" or perform military service—compulsory or otherwise—nor will they be the subjects of "peacetime conscription." During the period of training they will not be servicemen at all.

When their one year's training is completed, they *will* be inactive members of a *trained* reserve and subject to a call to active duty by the Congress only in case of a national emergency.

No American military system, no matter what the plans of the War Department may be, can continue to endure or to exist against the will of the Congress which controls the necessary funds; and if the people—the men and women who constitute the voting public—desire that universal military training be discontinued at any time following its adoption, they can and will say so at the polls in no uncertain terms.

The decision now rests with the representatives of the people—the Congress of the United States.

The present age has come to be known as the "era of the common man." He has the greatest stake in his country's future, for he composes the great majority of our people. To him will always fall the duty and the burden and the honor of fulfilling the basic purposes of the Constitution, among which is the obligation to provide for the common defense.

Individual Combat Stories Wanted

Combat against the enemy is generally a team play by troops, but often it is a contest of man against man. Victorious action against the enemy does not always come from a concerted attack by a squad or larger group. Quite frequently it is made possible by the bravery and tactical ingenuity of its leader or one of its individuals. Many of our readers undoubtedly know of instances where the success of a mission was made possible because of the action of an individual or a small group. Please write it for us in 1,000 words, or more . . . the exact details of how he, or they, did it. Although such actions probably resulted because of the personal bravery of those involved, we are interested in the tactical side and the details of what made it click. Describe the moves that were made in the action . . . the distances involved . . . disposition of the enemy and that of the attacking personnel . . . weapons used . . . the difficulties and obstacles met, and how they were overcome . . . if surprise was a factor, and how it was achieved . . . any unusual behavior of the enemy, how he met the attack, how he reacted—Jap, or German. Send it, with pictures if possible, to The Cavalry Journal, 1719 K St. N.W., Washington, D. C. These stories are very important for future study, as they can be used as examples for the training of our future armies.

The National Guard Program

Officer Training Course

AS a preliminary step toward the postwar National Guard, courses have been established to "orient and train selected officers for duty as instructors," it has been announced by General Jacob L. Devers, commanding general of Army Ground Forces. These courses, taking advantage of past experience, in peace and war, are designed for uniform results and to "start all National Guard instructors on a sound basis."

There will be three separate programs, one for senior state instructors, one for officer instructors other than senior state instructors, and one for sergeant instructors.

Senior state instructors, who will report to the state capital concerned approximately one month prior to the actual reorganization of the National Guard within that state, will first attend a 10-day "orientation course" in Washington, D. C. It will largely embrace study of War Department policies, National Guard history, and typical training and administrative problems. The Chief of Staff, United States Army, and the Commanding General, Army Ground Forces, are scheduled to appear before this school, together with outstanding army officers previously National Guard senior instructors and also successful in World War II combat.

The courses for officer instructors other than senior state instructors will run for 30 days at the Infantry, Field Artillery, Armored, Cavalry and Antiaircraft Artillery Service Schools. Each course will have an original capacity of 100, with a class of 50 starting every two weeks thereafter, and will offer refresher instruction on the latest tactics and technique, and general orientation on the War Department and the National Guard.

The courses for sergeant instructors, also running for 30 days at the Service Schools with 100-pupil capacities, will take up the same general orientation subjects and in addition drill on specific duties to be performed.

* * *

Tentative state allotments for the postwar National Guard have been forwarded to the governors of the states and insular possessions. The total strength of the postwar National Guard as presently contemplated by the War Department approximates 622,500 officers and enlisted men. The aggregate of National Guardsmen inducted into Federal service prior to the war was 300,-034.

The planned strength calls for about 571,000 officers and men in the Ground Forces and 47,600 in the Air Forces. The prewar National Guard comprised approximately 295,000 in Ground Forces and about 5,000 in Air Forces, the latter composed of 19 Observation Squadrons (Divisional Aviation) and an additional 10 activated just before the war. In the postwar Ground Forces the principal units will be about 22 infantry divisions, **two armored divisions,** and 18 regimental combat teams. The postwar Air Forces will include about 12 wings, 27 groups, and 84 squadrons, as well as 12 control and warning groups.

In letters authorizing the allotments, the governors have been requested to undertake an immediate survey of their capabilities for recruiting and maintaining their respective allotments. In the event that changes are necessary, the National Guard Bureau indicated that the allotments may be altered.

Under War Department policy, it is normally the responsibility of the states to provide and maintain armories and storage facilities adequate for the housing of personnel and the storage of equipment. Such adequacy will be determined by Federal inspection and approval. The recruiting of personnel is also the responsibility of the states.

The state tentative allotments are:

STATE	GROUND	AIR	TOTAL
NORTHEAST AREA:			
Connecticut	10,609	789	11,398
Delaware	2,382	312	2,694
Maine	6,454	384	6,838
Massachusetts	21,056	1,505	22,561
New Hampshire	5,726	312	6,038
New Jersey	19,978	698	20,674
New York	44,112	3,665	47,777
Rhode Island	4,243	703	4,946
Vermont	3,563	312	3,875
EAST CENTRAL AREA:			
District of Columbia	2,600	789	3,389
Kentucky	7,595	384	7,979
Maryland	8,994	312	9,306
Ohio	19,982	2,551	22,533
Pennsylvania	36,632	2,948	39,580
Virginia	12,570	312	12,882
West Virginia	5,426	312	5,738
SOUTHEAST AREA:			
Alabama	10,128	1,104	11,232
Florida	7,220	312	7,532
Georgia	10,880	1,505	12,385
Mississippi	6,684	312	6,996
North Carolina	10,970	717	11,687
South Carolina	7,396	312	7,708
Tennessee	10,622	696	11,318
NORTH CENTRAL AREA:			
Colorado	5,174	1,989	7,163
Illinois	30,735	2,173	32,908
Indiana	16,237	1,087	17,324
Iowa	10,989	1,101	12,090
Kansas	7,377	312	7,689
Michigan	22,599	1,416	24,015
Minnesota	12,403	1,087	13,490
Missouri	11,576	1,522	13,098
Nebraska	5,376	312	5,688
North Dakota	3,694	312	4,006
South Dakota	4,173	312	4,485
Wisconsin	15,089	1,101	16,190
Wyoming	1,097	312	1,409
SOUTH CENTRAL AREA:			
Arkansas	7,025	312	7,337
Louisiana	10,403	703	11,106
New Mexico	3,762	312	4,074
Oklahoma	13,226	696	13,922
Texas	27,082	2,239	29,321
WESTERN AREA:			
Arizona	3,788	312	4,100
California	34,949	4,619	39,568
Idaho	5,304	312	5,616
Montana	3,788	312	4,100
Nevada	794	312	1,106
Oregon	9,009	775	9,784
Utah	4,393	312	4,705
Washington	10,712	1,526	12,238
INSULAR:			
Hawaii	8,595	312	8,907
Puerto Rico	9,693	312	10,005

The postwar National Guard contemplates the continuation of many of the units closely identified with the

military history of their states of origin. Of necessity, the expansion of the National Guard Air Forces calls mainly for the activation of new units but all the former National Guard air units will be reactivated.

The principal ground and air components as proposed to the governors of the various states are as follows:

NORTH EAST AREA: *CONNECTICUT*—two regiments of the 43rd Division, one aircraft control and warning squadron, one fighter squadron; *DELAWARE*—one fighter squadron, coast and antiaircraft artillery units; *MAINE*—one regimental combat team, one fighter squadron; *MASSACHUSETTS*—the 26th Division, 51st Headquarters and Headquarters Squadron, one control and warning group headquarters, two fighter squadrons; *NEW HAMPSHIRE*—one fighter squadron, one regimental combat team; *NEW JERSEY*—the 44th Division, two fighter squadrons; *NEW YORK*—the 27th Division, one regimental combat team, 52nd Wing Headquarters and Headquarters Squadron, three control squadrons, one light bombardment group headquarters, four fighter squadrons; *RHODE ISLAND*—elements of the 43rd Division, one control squadron, one fighter squadron; *VERMONT*—one regiment of the 43rd Division, one fighter squadron.

EAST CENTRAL AREA: *DISTRICT OF COLUMBIA*—one control and warning squadron, one fighter squadron, miscellaneous antiaircraft units; *KENTUCKY*—one fighter squadron, one regimental combat team; *MARYLAND*—two regiments of the 29th Division, one fighter squadron; *OHIO*—the 37th Division, 55th Wing Headquarters and Headquarters Squadron, two control squadrons, one light bombardment squadron, three fighter squadrons; *PENNSYLVANIA*—the 28th Division, one regimental combat team, 53rd Wing Headquarters and Headquarters Squadron, two control squadrons, two light bombardment squadrons, three fighter squadrons; *VIRGINIA*—one regiment of the 29th Division, one regimental combat team, one fighter squadron; *WEST VIRGINIA*—one fighter squadron, one regimental combat team.

SOUTH EAST AREA: *ALABAMA*—two regiments of the 31st Division, one control and warning squadron, one light bombardment squadron, one fighter squadron; *FLORIDA*—one regimental combat team, one fighter squadron; *GEORGIA*—two regiments of the 48th Division, 54th Wing Headquarters and Headquarters Squadron, one control squadron, two fighter squadrons; *MISSISSIPPI*—one regiment of the 31st Division, one fighter squadron; *NORTH CAROLINA*—one regiment of the 30th Division, one control squadron, one fighter squadron; *SOUTH CAROLINA*—one regiment of the 48th Division, one fighter squadron; *TENNESSEE*—two regiments of the 30th Division, two fighter squadrons.

NORTH CENTRAL AREA: *COLORADO*—59th Wing Headquarters and Headquarters Squadron, three control squadrons, one fighter squadron, one regimental combat team; *ILLINOIS*—the 33rd Division, one regimental combat team, 56th Wing Headquarters and Headquarters Squadron, one control squadron, two light bombardment squadrons, two fighter squadrons; *INDIANA*—the 38th Division, one control squadron, two fighter squadrons; *IOWA*—two regiments of the 34th Division, one control squadron, two fighter squadrons; *KANSAS*—one regiment of the 35th Division, one fighter squadron; *MICHIGAN*—the 46th Division, one light bombardment squadron, one control squadron, two fighter squadrons; *MINNESOTA*—two regiments of the 47th Division, one control squadron, two fighter squadrons; *MISSOURI*—57th Wing Headquarters and Headquarters Squadron, one control squadron, one light bombardment squadron, one fighter squadron, two regiments of the 35th Division; *NEBRASKA*—one regiment of the 34th Division, one fighter squadron; *NORTH DAKOTA*—one regiment of the 47th Division, one fighter squadron; *SOUTH DAKOTA*—one regimental combat team, one fighter squadron; *WISCONSIN*—the 32nd Division, one control squadron, two fighter squadrons; *WYOMING*—**one mechanized cavalry reconnaissance squadron,** one fighter squadron.

SOUTH CENTRAL AREA: *ARKANSAS*—one regiment of the 39th Division, one fighter squadron; *LOUISIANA*—two regiments of the 39th Division, one control and warning squadron, one fighter squadron; *NEW MEXICO*—elements of the 49th Armored Division, one fighter squadron; *OKLAHOMA*—the 45th Division, two fighter squadrons; *TEXAS*—the 36th Division, **elements of the 49th Armored Division,** 58th Wing Headquarters and Headquarters Squadron, two control squadrons, one light bombardment squadron, two fighter squadrons.

WESTERN AREA: *ARIZONA*—one regimental combat team, one fighter squadron; *CALIFORNIA*—the 40th Division, **elements of the 50th Armored Division,** 61st and 62nd Wing Headquarters and Headquarters Squadrons, six control squadrons, one light bombardment squadron, three fighter squadrons; *IDAHO*—one regiment of the 41st Division, one fighter squadron; *MONTANA*—one regimental combat team, one fighter squadron; *NEVADA*—**one cavalry reconnaissance squadron of the 50th Armored Division,** one fighter squadron; *OREGON*—one regiment of the 41st Division, **elements of the 50th Armored Division,** one control squadron, one fighter squadron; *UTAH*—one regimental combat team, one fighter squadron; *WASHINGTON*—one regiment of the 41st Division, 60th Wing Headquarters and Headquarters Squadron, two control squadrons, one fighter squadron.

INSULAR POSSESSIONS: *HAWAII*—two regimental combat teams, one fighter squadron; *PUERTO RICO*—two regimental combat teams, one fighter squadron.

The Organized Reserve Corps

OFFICERS of the Organized Reserve Corps today are giving serious thought to future policies and plans for the training and employment of this vital force in our National Security System. This is shown by the marked increase of memberships in the Reserve Officers' Association, and the Organized Reserve Corps.

The plan drafted for the United States Military establishment calls for a three component set-up: the Regular Army, the National Guard and the Organized Reserve Corps.

The Organized Reserve Corps will be composed of the Active Reserve, and an Inactive Reserve. The Active Reserve will consist of those individuals and units sufficient in numbers and types which will, together with other components, constitute an over-all balanced force in the Army of the United States. The number and types of units to be activated will be dependent on the approved War Department Troop Basis for the Organized Reserve.

The plan calls for the organization of the Reserve component into three classes. Class A will include fully organized units, complete with full T/O complement of officers and enlisted men with all organizational equipment. Class B units will be provided with a full complement of officer personnel and enlisted cadre plus a portion of unit equipment. Class C units will be those provided only with a full complement of officer personnel.

Allocation of these units will be based on: the density of male population of military age within certain sections of the country, in order to provide proper distribution of the units within military areas; the availability of personnel for the units requiring technically trained personnel; and the availability of regular army and National Guard units to facilitate training.

Reserve Units will be organized initially as Class C units and will progress through a prescribed training and organizational cycle until they have reached Class A.

Officers who receive assignments in one of these units will be assigned in the grade held in the ORC; however, officers with wartime experience, who have satisfactorily performed duties of a higher grade, may be promoted to fill T/O vacancies in such units. Graduates of ROTC and Officers' Candidate School will form a source of subsequent procurement as well as officers who served honorably in the armed services.

Initial assignments of enlisted men will be made from volunteers who are veterans and have served honorably in the armed services in the present war. Other sources of enlistment will be the men being discharged from the armed services, and from the voluntary enlistments in the ORC.

Officers and enlisted men who are not assigned to ORC units will constitute a reservoir of strength needed for the expansion of the Army of the United States, and as replacements for all components. All enlisted men will be considered in the Active Reserve, and Officers who meet the standard prescribed by the War Department will be classed as Active Reserve. Officers who fail to meet these standards will be placed on Inactive Reserve.

Training objectives will be accomplished through: (1) Active Duty. (2) Attendance at Service Schools. (3) Inactive duty training. (4) Army Extension Courses.

Every opportunity will be provided for enlisted men and officers to advance and earn promotion. An opportunity will be provided for both enlisted men and officers to progress through the entire system of military schooling. Reserve Officers will be offered the opportunity to attend the same courses as officers of the Regular Army. Selected enlisted men will be detailed to officers' candidate schools and become eligible for appointment as second lieutenants. The grades and ratings for enlisted men assigned to units will be the same as those prescribed for Regular Army.

Instructors will be assigned to the Organized Reserve Corps in a sufficient number to efficiently supervise the instruction and administration of all units. Warrant Officers or enlisted instructors will be assigned to assist commissioned instructors on the basis of one or more for each commissioned instructor.

The provision for fully manned and equipped Reserve Units probably is the most progressive step yet taken for training members of the Reserve Component. In addition to the training value of uninterrupted contact between enlisted men and officers in perfecting themselves and their unit for emergency service, the *esprit de corps* developed by membership in a flesh and blood unit rather than one which exists only on paper is inestimable.

Although it is realized that the information presented here is scant, it is all that is available at the present time.

As plans progress and new information becomes available it will be disseminated to the field.

A 5th Armored Division tank, U. S. Ninth Army, passes a dead Nazi as it drives through Germany on April 2, 1945.

A burning German vehicle, knocked out by the Ninth Army, and which was obstructing the highway, is towed clear by a 7th Armored Division tank of the 31st Tank Bn.

A tank of the 6th Armored Division, U. S. Third Army, followed by infantrymen, advances through the town of Oberdorls, Germany, which this division captured.

U. S. ARMORED DIVISIONS IN WORLD WAR II

(To be continued)

Signal Corps Photos

Tankdozers of the 8th Armored Division, U. S. Ninth Army, are shown being driven over tank traps in Germany.

Book Reviews

THE NRA BOOK OF SMALL ARMS. Vol. I, Pistols and Revolvers. By W. H. B. Smith. Military Service. $10.00.

There has long been a vital need felt for a comprehensive book on small arms which gave more than a meager coverage of technical data. Under the auspices of the National Rifle Association and the Military Service Publishing Company, the author of *Basic Manual of Military Small Arms,* has met this need with regard to pistols and revolvers in the first volume of *NRA Book of Small Arms.* Subsequent volumes to be published about a year apart, will cover Rifles and Shotguns, Submachine Guns and Machine Guns, and Ballistics.

The first section of Volume I gives an analysis of the functional development of hand weapons. The second and largest section, handled by calibers and arranged alphabetically by manufacturers names, includes exhaustive technical and ballistic data as well as complete operational details of important major weapons. The third section is given over to excellent illustrations and minute details of each minor weapon. A complete glossary gives full and comprehensive explanations of all technical terms used.

No book of this type would be complete without a thorough coverage of ballistic data. Entirely new information on United States revolver and pistol cartridges was compiled by the Western Cartridge Company. The H. P. White Company prepared the material on foreign and obsolescent cartridges.

This is without any question the most exhaustive book in publication on the subject of small arms. Its value to military and sports men cannot be estimated. Undoubtedly it will be a must for any complete library, personal or public.

* * *

CLOAK AND DAGGER. By Corey Ford and Alastair MacBain. Random House. $2.50.

SUB ROSA. By Stewart Alsop and Thomas Braden. Reynal & Hitchcock. $2.50.

The lurid and fascinating tale of the work of the Office of Strategic Services will probably never be told in its entirety—certainly not for many years. *Cloak and Dagger,* whose authors were connected with OSS, gives a few scattered and exciting stories of the men who went into the far corners of the world bent on propaganda, sabotage, intelligence work, and the organization of underground warfare. Brief and sketchy as these stories are, they rival any mystery or spy story for reader-interest, and at least give an inkling of the kind of a job undertaken by these anonymous men. The complexities of modern warfare are once again emphasized, as well as the versatility demanded of any army if it is to compete successfully with unscrupulous nations.

Unfortunately several incidents, such as the negotiations with General Wolff, are not adapted to summarization and the reader is left somewhat confused by the whole episode. Most of the cases, however, are excitingly handled and suffer only from a want of finer writing, a not too important requisite for this type of factual thriller.

Sub Rosa covers much the same material, and many of the same incidents, contained in *Cloak and Dagger.* Its authors were actually engaged in active "behind the lines" activities, both were with a "Jedburgh" mission, and their accounts are well written and have a most authentic note.

In *Sub Rosa* the authors do not hesitate to acknowledge many obvious weaknesses, and to point out specific faults which undoubtedly could have been corrected to advantage. Both of the books on OSS are interesting reading, but the last named is a superior piece of workmanship and a more constructive analysis.

* * *

PATTON: The Fighting Man. By William Bancroft Mellor. Putnam. $3.00.

It is perhaps unfortunate that the author has chosen to call this book *Patton: The Fighting Man* because as a study of this great general's tactics and campaigns it is far from an adequate contribution to our knowledge. However, it is an excellent biography of his earlier years, and the material generously contributed by his immediate family has enabled Mr. Mellor to give an accurate and extremely interesting picture of the youth and young manhood during which a great cavalryman grew into a magnificent general.

That portion of the book dedicated to this war is hurried and unsatisfactory. Someday a great story will be written about North Africa, Sicily and the Battle of the Bulge—but time must amalgamate the factors and the author will have to be a former staff officer, or a very serious student of military affairs.

Mr. Mellor's biography, hurried though it is, is better than might have been expected, and will certainly be of considerable interest to those who are not familiar with the early training and military experiences of George S. Patton, Jr.

* * *

GENERAL GEORGE CROOK: His Autobiography. Edited and annotated by Martin F. Schmitt. University of Oklahoma Press. $3.00.

His autobiography covers General Crook's life from his graduation from West Point in 1852 to June 18, 1876. His entire military career with the exception of the four Civil War years, was on the frontier.

While there is little new information added to our knowledge of the Civil War period or the west of the 19th Century, the frank analysis of situations and blunt, occasionally caustic, judgements of men and situations makes interesting reading. Students of this period will find much material in this objective and lively book.

THE STORY OF THE STARS AND STRIPES. By Bud Hutton and Andy Rooney. Farrar & Rinehart. $3.00.

Unique alike in the army and the newspaper profession, *Stars and Stripes* filled one of the most important needs of the soldier in the field—an outlet of self-expression wherein a man saw his gripes, his problems, his fears and sometimes his triumphs expressed as he could not express them himself. Somehow it made him feel better.

The Stars and Stripes of this war varied greatly from its predecessor of World War I although from all evidence it will father as many nationally known newspapermen of a high caliber as did the earlier paper. With a fine balance of humor and acumen, Bud Hutton and Andy Rooney have told the inside story of the eccentric and unmilitary staff and its efforts to honestly report the war.

Racy anecdotes of the staff, whether in their offices in the building of the staid and conservative *London Times*, drinking in the near-by pub, setting up shop in battered buildings on the continent or seeking news in combat, make fascinating reading. Underlying these lively accounts there is a more serious vein concerned with the many problems that faced these incorrigible newspapermen.

The book is extremely entertaining, and its reception by reviewers of such papers as the *New York Times* and the *New York Herald Tribune* is both interesting and significant.

* * *

FROM OMAHA TO OKINAWA. By William Bradford Huie. E. P. Dutton Co. $2.75.

Mr. Huie has already written *Can Do!*, and *Seabee Roads to Victory* to give the public an idea of what this amazing branch of the service contributes to total war. In this latest book he describes the work of the Seabees in the landings on the Normandy coast, Iwo Jima, Tinian, Saipan, Guam, the Philippines and Okinawa. Excellent photographs show the Seabees at work.

The tremendous job of building airfields, roads and other engineering projects was magnificently performed by these technical men, frequently too old for the regular army and navy. Unfortunately, too much space is given to names and individual addresses, robbing the book of much of the power it might have attained at the hands of a more objective writer.

* * *

HOW TO BE A CIVILIAN. By Morton Thompson. Doubleday, Doran. $2.00.

The author of the zany *Joe the Wounded Tennis Player* has written an amusing handbook illustrated by Charles Pearson of *Yank* for the returning veteran. Much sound advice is interspersed with humorous instructions and comments. How to Buy Civilian Clothes, The Job Deal, Organizations, TS and Hitting the Book are some of the chapter headings and much worthwhile advice will be found under them.

The language is that of the veteran, and may confuse the layman, but *How To Be A Civilian* will prove amusing to all readers.

PATTON:

The Fighting Man

By

WILLIAM BANCROFT MELLOR

The story of the most colorful general of World War II. A biography that every cavalryman will want to own.

$3.00

WASHINGTON TAPESTRY

By

OLIVE EWING CLAPPER

The Washington scene as viewed through five administrations by the widow of one of the nation's most honored newspapermen.

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One of the Most Important Stories of World War II

PATTON and HIS THIRD ARMY

By

COLONEL BRENTON G. WALLACE

The biography of an army. The story of one of the most amazing feats of history.

$3.00

BOOKS for the SPORTSMAN

Tranquillity

Tranquillity Revisited

Tranquillity Regained

By

COLONEL HAROLD P. SHELDON

The first two of these volumes was sold out in a limited edition. The Countryman Press has now provided not only these two works, but a third, *Tranquillity Regained,* in three pocket-sized volumes. They will delight any lover of gun, rifle, and hound who enjoys the flight of ducks.

$5.00 the set

Order your copies from The Cavalry Journal

WHILE YOU WERE GONE. Edited by Jack Goodman. Simon and Schuster. $3.50.

Originally planned primarily for the information of the veteran, this brilliant symposium has been developed into a popular history which will interest the intelligent civilian as well as the men who have been out of touch with happenings in the nation.

Twenty-four phases of the American home front at war are portrayed through the eyes of twenty-six authors (two of the chapters are collaborative). Each contributor is an authority on the subject discussed and the editor has endeavored to maintain a middle of the course balance in his selection of authors. While this policy has not resulted in an impartial study, it has produced a variety of weighed opinions, sometimes at variance and occasionally controversial. Any reader will inevitably take issue with some viewpoints and agree with others; but everyone will find interest and amusement in the quizzical and clever descriptions of the civilian front, and much valuable information in the serious analyses of important occurrences.

MOM, I'M HOME! By Hoff. Doubleday, Doran. $2.00.
THE WOLF. By Leonard Sansone. Crown. $1.00.

The author of *Mom, I'm Home!* says, "The author is bitterly ungrateful to World War II for the ideas in this book." This lack of gratitude will be understood but not concurred in by the reader of Syd Hoff's sensitively humorous depiction of the confusing incidents of a returning soldier.

The Wolf needs no introduction. His career is continuing with its usual success.

REVEILLE FOR RADICALS. By Saul D. Alinsky. Chicago University Press. $2.50.

The title of this book is both daring and unfortunate. It may repel many readers and that would be a most unfortunate circumstance. Mr. Alinsky describes a "liberal" as one who dreams dreams, a "radical" as one who builds the world of men's dreams. He brings out the indisputable historical fact that the men we most revere in this country were radicals, Thomas Jefferson, Thomas Paine, Benjamin Franklin, Patrick Henry, and a score of others.

A particularly significant chapter for present-day readers points out the similarity between big business and labor organizations. The attitude is clear visioned, and the phraseology unequivocal.

The building of People's Organizations in various communities with an aim to accomplish collectively what cannot be done singly is interesting and encouraging. The methods of organization are described and the plan of activity outlined.

Any reader interested in national affairs will find much instructive material in these pages and the "radical" concerned with a desire to do something more than commiserate with the poor, the uneducated, and the otherwise handicapped, will find a definite stimulus and direction.

THE BALANCE OF TOMORROW. By Robert Strausz-Hupé. Putnam. $3.50.

The author of *Geopolitics* has turned his attention to the bases from which world power is derived, with particular attention to the potential assets of the United States. He takes into consideration the problems of population, agricultural resources, industrial possibilities and natural resources. He measures our assets and analyzes our trends, not overlooking the importance of the less tangible, but equally important, spiritual forces, and their influence on our foreign policy.

One passage of particular significance at this time bears quoting here:

"American power will be dependent upon the military force available at any given moment. The dangers of the future can no longer be met by the improvisation of a large fighting establishment. A minimum of strength will have to be available at any time, not only on paper, but so equipped that it can intervene on distant battlefields at short notice. Never again will the United States have three or four years to arm in wartime while the enemy is being kept at a safe distance from the centers of America's power."

TROUBLE ZONE. By Leon Dennen. Ziff-Davis. $1.50.

In 1944 the author of this little book left New York for Istanbul, Turkey, on a rescue mission for an unnamed American relief agency. After nine months in the Balkans and the Middle East he saw the spiritual and political situation in that area as a vast conflict between England and Russia.

The political situations in this particular portion of Europe have always been confusing and frequently fraught with dynamite. Any country involved in its many-faceted problems will inevitably be criticized by observers, particularly Americans who are not as a rule too well versed in middle European political and social aspects. Whether or not Mr. Dennen's condemnations and appraisals of British and Russian actions are correct is a matter of conjecture. Much information that he gives is of considerable interest and his conclusions that only a democratic federation based on cooperation will bring peace to these small countries are in line with most constructive thinkers.

WAR YEARS WITH JEB STUART. By Lt. Colonel W. W. Blackford, C.S.A. Scribners. $3.00.

It is not known just when Colonel Blackford wrote down his recollections of his associations with General Stuart, but it is clear that time enough had elapsed for the war years to have become glamorized and for memory and subsequent information to have become somewhat mixed. The author is not objective, and it would be an anachronism if he were. He has recounted his experiences under the most glamorous general of the Civil War; military engagements are described but people, personalities, and entertainments are not forgotten. The charm of this interesting and nostalgic record is that of Thomas Nelson Page and is better read as a delightful, if somewhat fanciful, picture of an era rather than as a military history.

Have You Read - -

The White Tower, **by James R. Ullman**

The story of an American, an Englishman, a Frenchman and a German who climb the Alps with an Austrian girl and a Swiss guide.

$3.00

Arch of Triumph, **by Erich Maria Remarque**

The author of *All Quiet on the Western Front* depicts the life of a refugee physician in Paris just prior to the war.

$3.00

Brideshead Revisited, **by Evelyn Waugh**

A brilliant satirist views the post-World-War-I generation in the throes of religious fanaticism.

$3.50

The Practical Cogitator, **by Charles P. Curtis, Jr. and Ferris Greenslet**

The other name for this fascinating book is "The Thinker's Anthology." It is a selection of long and short prose and verse from many languages and a wide range of authors from Confucius to James Cozzens, the Old Testament to Gertrude Stein and James Joyce.

$3.00

The Story of the STARS and STRIPES

By

BUD HUTTON and ANDY ROONEY

The hilariously written story of the bitter struggles and hard-earned triumphs of the *Stars and Stripes*—the newspaper that General Eisenhower and the staff felt should be the soldiers' paper.

$3.00

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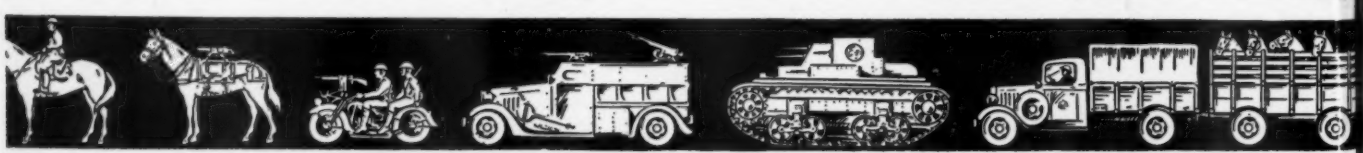
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